September/October 2008 >> Vol.39

# AECMAGAZINE

DESIGN, MANAGEMENT & COLLABORATION IN THE BUILT ENVIRONMENT



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## Planning for a sustainable future

IES delivers free environmental analysis tool for SketchUp

## MicroStation Athens preview

A huge step forward for Bentley

**Autodesk's Certification programme launches in the UK**

# AEC MAGAZINE
DESIGN, MANAGEMENT & COLLABORATION IN THE BUILT ENVIRONMENT


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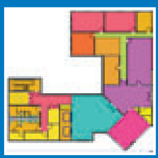
## Allied Images unveils new network scanner



**Allied Image**, UK and Ireland distributor for Colortrac's large format scanners, has announced the Colortrac SmartLF Ci 40 series scanners. These high definition (HD) 40" technical document scanners are designed to provide AEC, CAD and GIS professionals with instant-on, walk-up scanning and copying direct to an office network via Gigabit Ethernet or fast USB2 connection. The recommended list price of the entry-level 600dpi optical resolution SmartLF Ci 40m (monochrome) scanner including SmartLF All-in-One scan & copy software is £3,995.

***www.allied-images.com***

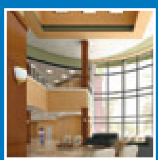
## AutoCAD Architecture joins Revit suite



**Autodesk** Northern Europe has released the AutoCAD Revit Architecture Suite 2009, which extends the Revit-based BIM package to include AutoCAD Architecture. The Suite now includes Revit Architecture, AutoCAD Architecture and AutoCAD, with a view to offering users a more smooth migration path from 2D to BIM-based methodologies.

***www.autodesk.com/revit***

## Revit finally gets Windows 64-bit support



**Windows 64-bit** support for Autodesk's Revit software is now available. This marks the company's first venture into 64-bit BIM applications and applies to Revit Architecture 2009, Revit Structure 2009 and Revit MEP 2009. Customer beta testers report that the new software applications offer significantly improved performance and stability for memory intensive tasks such as rendering, printing, model upgrading and file importing and exporting.

***www.autodesk.com/revit***

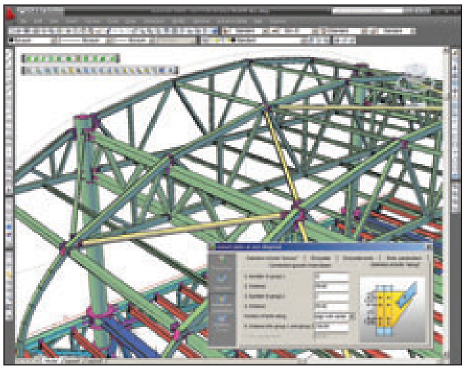
## Autodesk Certification launches in the UK

**Excitech,** one of the UK's leading CAD learning partners has announced the launch of Autodesk's Certification Program in the UK. Designed to complement continual learning and training, Autodesk Certification is designed to provide a cost effective skills and knowledge assessment of CAD Users for specific Autodesk applications.
A global standard, Autodesk Certification is currently available for AutoCAD, AutoCAD Architecture, AutoCAD Civil 3D, Autodesk Inventor and Revit Architecture.

***www.excitech.co.uk/pr2***

# Graitec's structural engineering suite set for expansion in UK

**The latest version** of Graitec Advance Steel 2009 has just been launched and will ship in the UK next month through Adris Computing Concepts which was purchased by Graitec SA in May last year. Graitec Advance Steel is an AutoCAD-based application specially developed for the steel industry with a view to increasing design productivity and production quality. It streamlines structural steel modelling and automatically creates general arrangement drawings, detailed drawings, material lists and NC files.



The new release sees many developments to the software including multi-user design sharing, partial-loading of large models, improvements to the automatic placement of dimensions, saw-cut lists now include images, plus many additional wizards for various automatic assemblies along with numerous other time saving enhancements.

December 2008 will see the launch of Graitec Advance Concrete into the UK, a software solution that is designed to accelerate modelling and drawing creation for concrete reinforcement and formwork drawings.

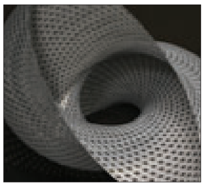
Advance Concrete provides powerful tools for quick placement of the structural elements, automated detail view creation, rapid reinforcement and a new drawing environment.

To complete the Advance Suite is Graitec Advance Design, which conducts static and dynamic analysis of 2D and 3D structures based on the finite element calculation method, which will be released in the UK in early 2009. The software features 3D climatic generator, non-linear calculations, support for large displacement phenomenon and structural optimisation.

Earlier this year Graitec and Adris Computing Concepts acquired Integer Software, the developer of SuperSTRESS, a structural analysis software for engineers in the bridge, civil and structural engineering sectors. Integer Software compliments the Advance Suite and Graitec has also developed the Graitec Transfer Centre (GTC Link) to enable the company's software programmes to run in conjunction with one another. This has also been developed to link with Autodesk Revit Structure and IFC / CIS/2 / PSS / SDNF files. ***www.graitec.com/En/as.asp***

***www.adris.co.uk / www.integer-software.co.uk***

# VectorWorks 2009 adopts Parasolid kernel



**Nemetschek** North America has unveiled the 2009 release of its Vectorworks family of design software. The suite includes Designer, Architect, Landmark, Spotlight, Machine Design, Fundamentals, and Renderworks.

Vectorworks 2009 features a new engine that is designed to give users enhanced 2D and 3D capabilities, at speeds that are claimed to be up to four to five times faster for modelling operations. In addition, new features and enhancements were developed with direct input from Vectorworks users, resulting in a new version focussed on enhanced usability, improved 3D modelling, and optimised workflows.

Vectorworks 2009 is powered by Parasolid, an industry-leading modelling kernel from Siemens PLM Software used widely in the mechanical CAD and manufacturing sectors. According to Nemetschek, this will provide a more robust environment for 3D modelling.

In addition, new interface functionality in Vectorworks 2009 includes a pre-selection indication feature which provides intelligent feedback from the cursor. When used in conjunction with drawing tools, SmartCursor snapping allows users to draw with more precision, claims Nemetschek.

***www.vectorworks.uk.com / www.vectorworks2009.net***

# Autodesk to incorporate point cloud technology

**Autodesk has** signed an agreement with Canadian firm Ambercore Software to license its point cloud technology to be incorporated into future Autodesk releases.

The new addition should soon allow users to visualise and analyse data in 3D for better and quicker building of 3D models.

Point clouds are extremely large data files created using laser scanning, high definition surveying, or LIDAR.

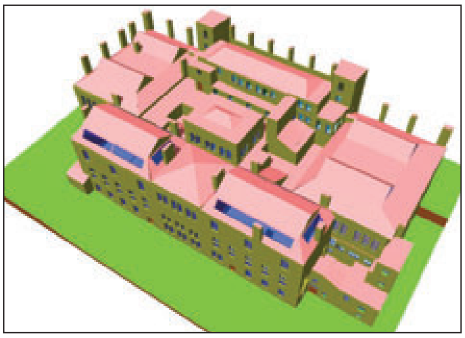
It is expected that this should be of use for civil engineers and those working in the AEC market as users will be able to incorporate BIM into projects earlier on, especially for those involved in road design and utility and telecommunications layouts.

"The point cloud technology from Ambercore Software will allow Autodesk customers to easily incorporate extremely large and highly accurate LIDAR data into the design and infrastructure management process," said Lisa Campbell, VP, Autodesk Geospatial. "The incorporation of this technology into Autodesk's portfolio of Geospatial and Building Information Modelling software means that our customers will be able to start with a digital model earlier in the design process or expand the precision and detail of existing infrastructure databases.

"As a result they will be able to create more accurate design and mapping information and use that information to visualise, simulate, and analyse projects before they are built."

***www.ambercore.com***

# Bentley Systems forms new Building Performance Group



**Bentley Systems** has created a new group dedicated to helping architects, engineers, construction professionals, and owner-operators design, build, and operate better-performing, more sustainable buildings.

Bentley's new Building Performance Group will focus on software solutions and products that address the need to create and maintain energy-efficient, environmentally friendly, safer buildings that also set the benchmark for occupant comfort.

Among the new group's current offerings are Bentley's recently acquired Hevacomp line of leading building services design software that includes products for energy analysis, heating and cooling load calculations, pipe and duct sizing, and electrical system design, and Tas software for energy analysis and simulation of large-scale building environments.

Commenting on the launch of the new group, CEO Greg Bentley said, "The creation of our new Building Performance Group underscores Bentley System's long-term commitment to providing comprehensive software solutions for sustaining infrastructure. It will make available a growing number of highly integrated, advanced software tools that architects, engineers, and low-carbon consultants can deploy to address the increasing demand for buildings designed with lifecycle performance in mind. These better-performing buildings will be more energy- and water-efficient, will emit less carbon waste, and will be safer to operate and work or live in." ***www.bentley.com***

# SketchUp plugged into building energy analysis



**Integrated Environmental Solutions** (IES), a specialist provider of Building Performance Analysis tools to the building design and refurbishment industry, has launched a plug-in to Google SketchUp. This plug-in links directly to IES's free VE-Ware tool which determines the Energy Use and associated Carbon Dioxide Emissions for any building, in any part of the world.

With the new tools it is possible to scientifically analyze for free how much energy a building uses and how that translates to associated carbon emissions. Users can also look at how modifications will affect the outcome. VE-Ware's calculation engine is part of the IES <Virtual Environment>, a building performance analysis tool used by architectural and engineering firms in the design of low-energy buildings. The calculations are based on real geometry, international data on local climate and weather conditions and the typical characteristics of different building, room and heating and cooling system types.

Dr Don McLean, the founder and MD of IES, commented: "I'm incredibly excited by today's launch, in many ways it's a culmination of fourteen years of work. When I founded IES in 1994 my aim was to develop what were primarily academic tools and bring them into mainstream use. Buildings are incredibly important in mitigating climate change – they account for around 40% of global CO2 emissions, but at the same time it is this sector which is the most cost effective when it comes to reducing those emissions. VE-Ware and our link to Google SketchUp gives everyone the capability to get involved and really opens the door wide to the incredible mitigation potential building performance analysis offers."

Meanwhile, turn to page 10 for an interview with Dr Don McLean. ***www.iesve.com/ve-ware***

# New support company targets Revit users

**Specialising in the** support of Revit for the architectural, structural engineering and MEP (Mechanical, Electrical, Plumbing) sectors, Digital Construction International has been launched by some of the team behind Revit Guru.

Offering on-site project analysis, software training and support to project setup Digital Construction International is a fully fledged Revit implementation consultancy. Catering for the increasing number of Revit users, the company sets itself apart from the usual user support systems by being independent from CAD dealerships.

Director Paul Woddy explains, "A call from a customer said that they had realised it wasn't in their best interests to buy the software and services from the same source.

"We don't get involved in the software sales, and have no defined targets to meet from Autodesk or anyone, we're there to provide a service. We do work very closely with dealers and provide additional support to those without the resources. However, we have no ulterior motives than to focus on providing support for Revit and other BIM associated technology."

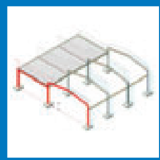
Fellow director, Derek Wilson, added: "Our on-site implementation specialists, with long-standing industry experience, evaluate your business processes and technology needs, teach you how to use the software and help you set up project templates and standards. The result is maximum productivity and return on investment, without the downtime involved in a learn-as-you-go process." ***www.dcbim.com***

## CSC releases Orion to Revit Structure link



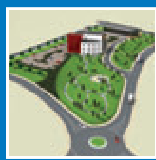
**CSC** has released a bi-directional integration between Orion, its reinforced concrete building design software, and Autodesk Revit Structure. In the development of this new link CSC applied the knowledge gained from its bi-directional integration between Fastrak Building Designer, its steel and composite building design software and Autodesk Revit Structure. ***www.cscworld.com***

## Autodesk adds to Revit Structure Extensions



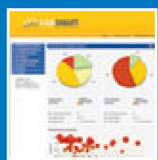
**Autodesk** has made five more Extensions available for Revit Structure for customers on subscription. The extensions include: Static Analysis of 2D frames, Static Analysis of continuous beams, Retaining wall reinforcement, Slab corner reinforcement, and Automatic reinforcement for multiple elements. ***www.extensions4revit.com***

## Quickscape to bring CAD models to life through Max



**Quickscape** is a new toolset for 3ds Max / 3ds Max Design, which comprises over 40 tools and hundreds of high quality modelling assets. The software works seamlessly with 3ds Max focussing on the creation of highways, external works and landscape, using design data from AutoCAD, Revit Architecture or Civil 3D. ***www.newvsol.com***

## CADsmart updates skills assessment software



**CADsmart** has released version 6 of its CAD skills assessment software for AutoCAD and MicroStation. The new release includes live video recording of candidate assessments, which can be replayed for training and support.

WSP Group, which provides design, engineering, management and consultancy services, has been using CADsmart since 2006. David Hoole, UK CAD improvement manager, says, "CADsmart has proved to be a valuable tool in increasing visibility and understanding of our large and diverse CAD user-base. The individual assessments combine to allow us to develop targeted training programmes, making efficient use of our resources. In addition to training needs analysis, CADsmart assessment also forms part of our recruitment process, helping to provide a more objective view of potential employees." ***www.cadsmart.net***

# Athens in the spotlight

**Marc Thomas,** senior consultant at Cadventure Ltd, previews the upcoming MicroStation 'Athens' and finds a host of new and improved features.

First shown to us in movie presentations at the 2007 BE conferences and now approaching its commercial release, MicroStation 'Athens' is a huge step forward. It builds on the foundations of the V8 file format update and the subsequent V8 XM display engine rewrite to enhance and pull together a set of new and existing features into an increasingly powerful toolset for design teams of any size.

A Bentley executive remarked shortly after the launch of MicroStation V8 that "MicroStation is now an excellent DWG editor", an apparently flippant remark that raised a laugh from the conference audience, which did, however, have deeper significance.

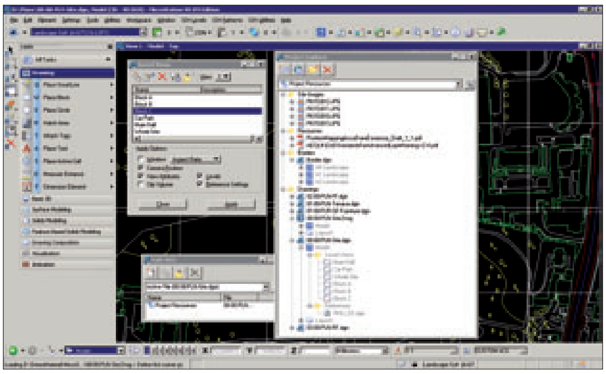
As Bentley's product range has become increasingly open to reading other formats, it will be interesting to see whether MicroStation will continue to widen its editing capabilities to further formats. The recent agreement with Autodesk raises my hopes that we are moving, albeit slowly, towards an environment where MicroStation and other applications will compete to be the best tools for managing and editing our data rather than seeking to contain us.

In response to the ever increasing breadth of MicroStation's toolset, changes have been in progress over several versions to rationalise the interface to ease use. These have carried on in 'Athens' particularly in the consolidation of the previously separate main tools and tasks toolboxes into a single tasks panel and the complete reorganisation of the Tools menu. However, one of MicroStation's strengths has always been compatibility with existing data and working methods; for the change averse the Main Classic toolbox still exists. The file format is of course unchanged.

Bentley is unashamedly targeting the world's largest construction projects. While this can lead to an impression that the software is over-complex for smaller projects, users can be sure that design and production work will not be held back by the software. Developing a wide range of applications for the largest projects makes features available to smaller projects that would otherwise not be feasible. Increasing numbers of features, some GIS tools for instance, are being drawn into the core of MicroStation.

'Athens' builds on XM to offer tools that can bring whole sections of workflow currently carried out in applications such as SketchUp and Photoshop back into MicroStation. While SketchUp is a brilliant application, it does have limitations and is not a solid modeller. Build anything complex in SketchUp and you will need to rebuild it in MicroStation solids before using it as the base for extracting useful production information.

Adding to the SketchUp style 3D manipulation and Colour Book tools previously included in XM, 'Athens' delivers a range of customisable display styles offering illustration style renders for screen and output, allowing far more graphical conceptual and presentation work to be completed entirely within MicroStation.



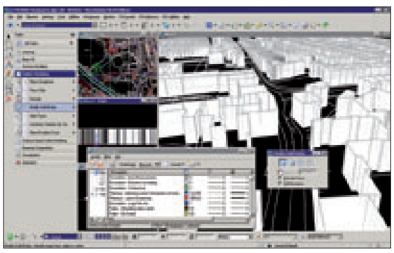
***XM's Project Explorer currently speeds access to files of any type adding display of MicroStation's reference files, saved views and models. All features that will be more central to parts of the 'Athens' workflow.***

Following on from this, Bentley's most recent major announcement is the licensing of the Luxology rendering engine. Luxology will gradually supersede some, if not all, of MicroStation's existing rendering methods to bring new levels of speed and additional rendering features that MicroStation's visualisation community have been crying out for. As always, existing MicroStation data will be compatible with this update.

Dynamic views were impressively demonstrated in a slide show at BE 2008. The real-time section cutting and ease of placement is stunning, particularly in comparison with Bentley's previous section cutting tools. Bear in mind that this is being done to large scale fully solid modelled architectural projects. The attractions of easily generating plans and sections on the fly using these tools are obvious, the difference here is that these visually arresting tools are also generating valuable production information, not only presentation material.

The transition to 'Athens' will be both easy and challenging. The easy part is taking existing methods and workflow forward, simply taking advantage of the interface and tool enhancements and additions. Users will not need extensive training to simply do what they already do in 'Athens'. If you have already moved, or are about to move to XM, changes that you make, establishing dgnlib library files for levels and text styles for example, will carry through to 'Athens' unchanged.

The challenging part will be the transition to a 3D workflow. However this challenge is not posed by the software, it is primarily about process and mindset. The tools provided by 'Athens' will help to ease this transition. Having moved existing processes to 'Athens', users can learn new workflows in a familiar environment using existing data, building up their skills in parallel with their organisation's development of process.



***MicroStation is sometimes overlooked as a concept modelling tool. This simple extrusion of a city quarter took seconds to produce in XM. 'Athens' is going to improve on the XM concept modelling toolset.***

The most exciting trend for MicroStation and other AEC applications is the incorporation of building physics into the foundation toolsets. Bentley's continuing acquisition of structural and environmental analysis applications will lead to the availability of an increasingly wide range of analytical tools earlier in the MicroStation design process helping designers make fundamental decisions on a more informed basis. By providing benefits that are only available in a 3D environment, AEC firms are given even more encouragement to make the jump from existing 2D workflows.

To prepare for 'Athens' if you are currently an XM user, take a close look at several existing features to understand how they work and review existing workflows. V8 introduced sheet models initially for DWG compatibility. While these already have significant advantages over conventional MicroStation 2D plotting workflows they will be fundamental to 'Athens' 3D workflows offering a double return on time invested. Annotation Scale, introduced with V8, and Project Explorer introduced with XM, as well as the long established Saved Views are other essential companions to this in the 'Athens' drawing composition workflow.

The hardware requirements for 'Athens' are loosely stated by Bentley as 2GB RAM plus a DirectX 9c compliant graphics card. Current experience suggests that a recent card with 256MB of graphics RAM should be regarded as a minimum, 512MB is advisable. From XM onwards MicroStation's graphics have been entirely driven by DirectX so you may find that gaming cards are better suited to 'Athens' than some OpenGL optimised certified workstation cards. This is an area that requires further exploration.

While MicroStation currently remains single threaded, one of the advantages of the Luxology rendering engine mentioned above is that multi-threading will now be used by Luxology rendering processes, good news for owners of dual or multi core processors.

Bentley Select subscribers can download the latest 'Athens' beta and find out more about on the BE Communities website.

***www.bentley.com***

# Real Google Analytics

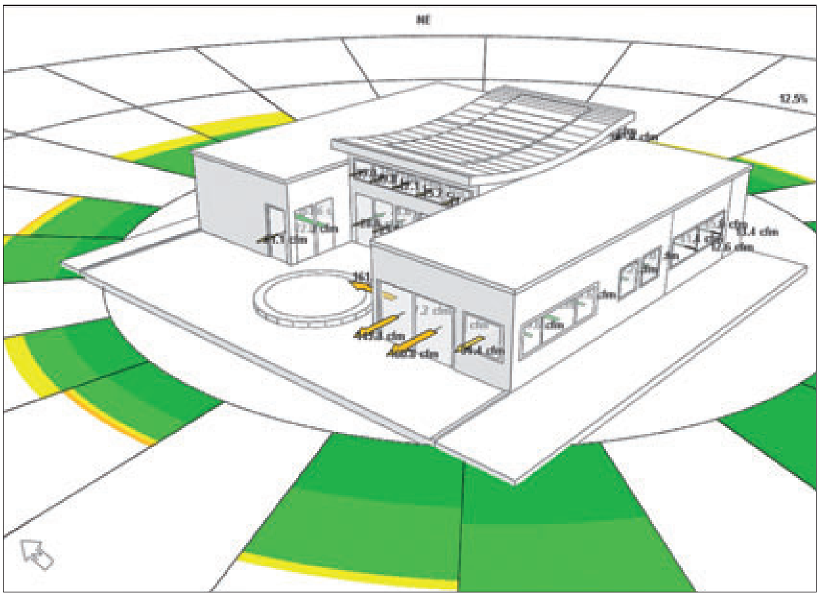
Integrated Environmental Solutions (IES) has already developed and given away a free environmental analysis tool for Revit customers. Now it has developed an environmental analysis tool for Google SketchUp, which is also free. **Martyn Day** talks to CEO, **Don McLean** about his company's commitment to green design.

**Martyn Day:** IES appears to be establishing a track record of getting green building analysis tools to everyone in this industry. Working with Google and supporting SketchUp, which has tens of thousands of professional users, must be an exciting opportunity?

**Don McLean:** It's very exciting, but I think I'm long enough in the tooth to know that what I think doesn't matter — it's what other people think that's important. When you go somewhere and hear other people talking about how excited they are about what you have released, you know you've done ok. I'm really glad people understand the significance of what's happened and what we've provided here. I'm very, very excited about it, and the wider implications of what will happen next.

**Martyn Day:** It appears that building analysis is moving out from the back room and away from specialists. Do you agree that now anyone with SketchUp can do sustainable design analysis?

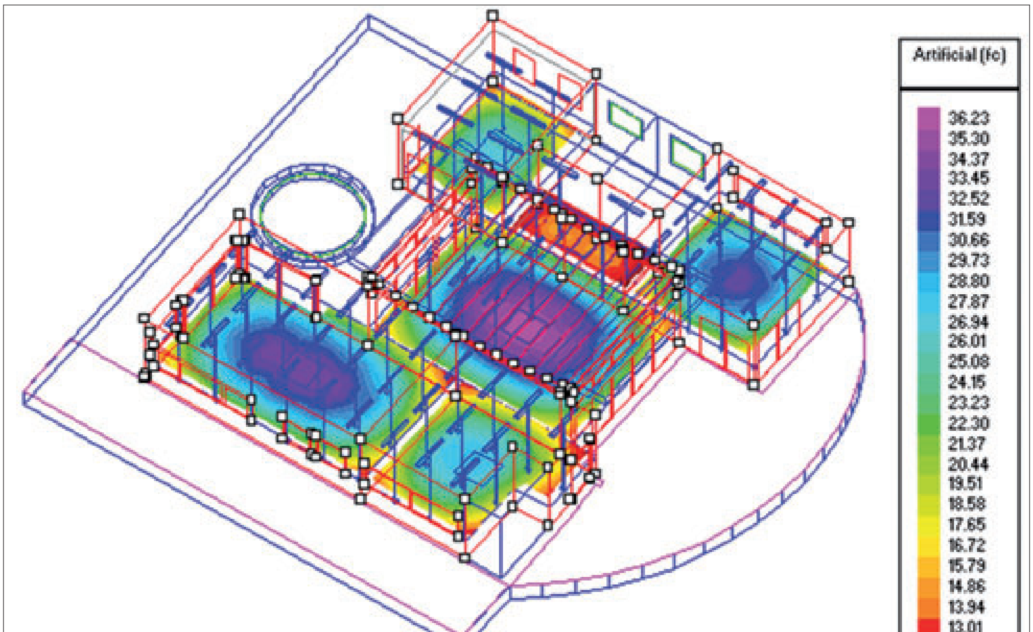
**Don McLean:** We saw to some extent that the tie-in to Revit would give us access to another market. When we first developed our connection to Revit, we concentrated on Revit MEP and a lot of architects asked why we hadn't done it for Revit Architecture, as they wanted those tools. Once we did that what we began to find was that there was a great traction in a lot of companies. They told us that the people who really wanted to have access were using SketchUp, and asked why we didn't do a version for that application? So we did.






*Don McLean, CEO of IES.*

Left: *Wind plays an important part in cooling a building. Here VE-Ware displays the output showing wind rose and bulk airflow arrows.*




*A colourful depiction of the artificial lighting levels within a building under analysis.*

**Martyn Day:** Without any formal training in engineering, are designers really going to understand what the software is telling them?

**Don McLean:** The free software is very straightforward and easy to use. However, for our professional products, we do a lot of consultancy. We also do a lot of training and we're increasingly turning our training and our consultancy into educational messages to try to make designers solve problems in different, sustainable ways.

The trouble is, there are a lot of designers in the industry who are trying to get a handle on all of this, but they are under time constraints. There's also just so much 'greenwash' out there at the moment that confusion reigns, and what we're trying to do through the consultancy, and particularly the training, is to try to look at different ways of educating people in sustainable design. We've just set up a new course and we're actually trying to get it approved by the American Institute of Architecture and also RIIBA, where we're trying to teach architects the fundamentals of green building techniques.

I'm starting to realise that architects know more than they probably realise and it's just a question of applying that implicit knowledge with a little bit of additional stuff to help them then begin to pick it up. It requires a little more of a physics background but, really, it's just common sense. If you make something hot, it rises; if you make something denser then it'll heat up. These are little basics, which people do know, but they just don't know that they know! We are trying to make sure that architects bring this into their working practices and have tools that they can use quickly to give them results.

**Martyn Day:** I guess using the software and experimenting is also a great way to learn?

**Don McLean:** We have found that people who use our solutions actually become better, quicker because they're trying things out all the time and learning

from the results. And once you do this a few times, your ability and understanding increases really quite disproportionately to other ways of learning about sustainable design, like reading a website or something.

Our free tools are part of what we see as important in the educational aspect of sustainability — it's to try to get more people able to understand the impact of their design decisions.

**Martyn Day:** So what was the original concept around giving away analysis tools?

**Don McLean:** The idea around our original free product for Revit, launched three or four months ago, was the drive in the States around something called the 2030 challenge (www.architecture2030.org).

America doesn't have any building regulations that force sustainable design on architects, it's all voluntary. So there's a big movement in America around 2030 challenge, which aims to get all new buildings and major renovations to reduce their fossil-fuel consumption by 50 percent by 2010, incrementally increasing the reduction for new buildings to carbon neutral by 2030.

There are a lot of people signed up to it, but nobody knows how to do it. There are no tools for it. You really need to do analysis, so we provide a tool that is based on our fundamental thermal simulation technology it runs a simulation and gives you three primary bits of information: energy consumption, carbon emission and how the design performs against this 2030 challenge. That's all it does but it's useful.

The way that we've made it work is very easy for people to use and see how their designs can be improved. Architects can add and remove components, change the overall construction, materials etc. So for an architect, it's not difficult to see what makes carbon output go down; to see that something's got better.

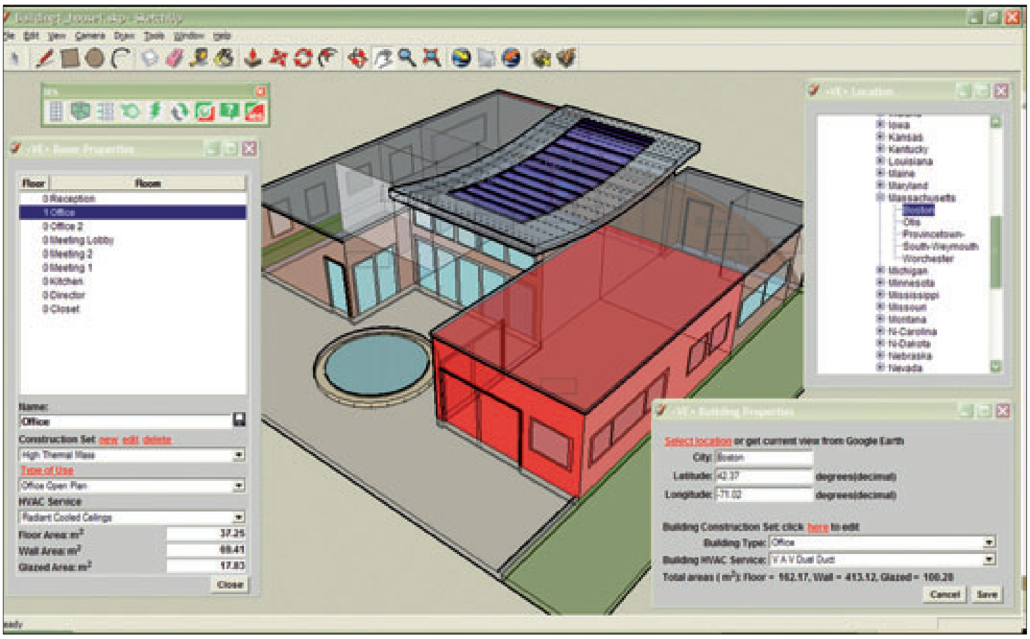
**Martyn Day:** Are you frustrated with the industry's slow approach to adopting sustainable design?

**Don McLean:** At the moment climate change is not really affecting people on a day-to-day basis. We're all aware of it but there's no sense of urgency and that's what particularly worries me, especially in the construction industry.

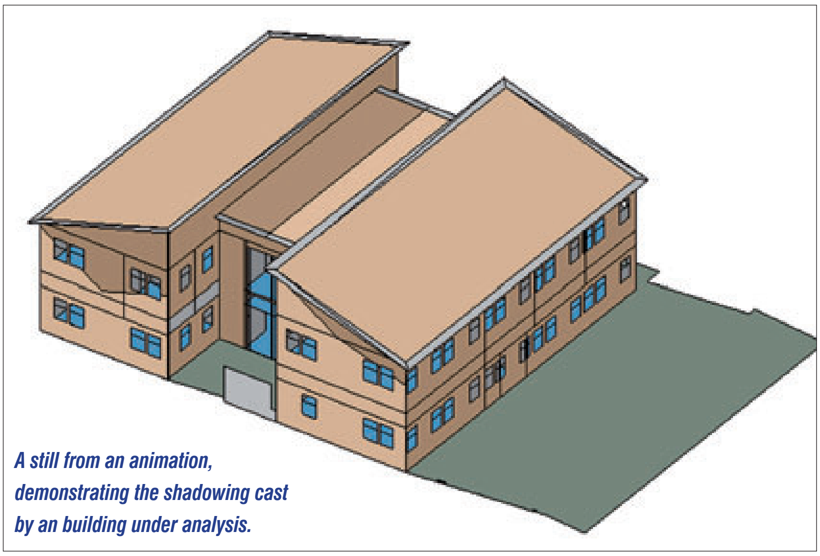
There's no urgency in that the buildings we're putting up right now won't be having a big impact on climate change say in 30, 40, 50, 60 years downstream. And for me, there's an awful lot of emphasis on the wrong kind of areas in terms of sustainability.

I know I say this quite glibly, but you know, people say they're worried about whether they use this kind of material or that kind of material. That's fine, but it doesn't really matter what material you use if you're under six metres of water.

So let's get the priorities right here. The priority here is reducing carbon and the best way to do that is not by funding lots of wind turbines and things like that, it's actually about making us reduce our energy consumption. And in buildings, as we well know, they make such a large proportion — 40 percent of our total energy consumption.



*SketchUp running IES' new plug-in, enabling environmental analysis in probably the most popular conceptual tool on the planet.*



*A still from an animation, demonstrating the shadowing cast by an building under analysis.*

Now I'm not trying to suggest that we do that tomorrow, but there's so much we could do very quickly and very simply today. We have a number of architects and engineers who are pushing on that front but it's to get the mass market to start to do it.

This is where our free tools come in. The only way I can see to start people question what they're doing is to give something away. If it's free I have removed one barrier from people at least experimenting. If people find they can save five percent of their energy, they'll feel happy and from this we slowly start to build up the momentum.

As it's free, I don't see any reason why an architect should not now have SketchUp and our free software on their machine to get a quick idea of energy performance in the early stages of the design.

**Martyn Day:** You don't make money from the Revit and SketchUp tools, so what's your business model?

**Don McLean:** These free tools really excite me. Working with Google and Autodesk has been a big turnaround for us as a relatively small company. However, it's not our core business. We've got three levels of software: the freeware; what we call the toolkits, which are predominately aimed at architects that can do things very quickly; and then you've got a full software that offers very powerful analysis capabilities, such as Computational Fluid Dynamics (CFD).

Having the three levels of tools means that people can migrate to more detail, should they need it. Even if downloaders of the free tools don't want to go to the paid solutions, you can still do good quality sustainable design and we are glad to have chosen to help make sustainable design achievable from that perspective. That's really what we're excited about: getting more and more people get into the concept of sustainable design.

***www.ies.com***

## "People say they're worried about whether they use this kind of material or that kind of material. That's fine, but it doesn't really matter what material you use if you're under six metres of water."

**Don McLean,** *CEO, IES*

# The importance of learning and development to your organisation

**Richard Mitchell** from Excitech takes a look at Autodesk's recently launched Certification Program and the benefits that it can bring to both an organisation and its most important assets – its employees.

Is it really clichéd to say that an organisations greatest asset is its people? Some will say the brand, fixed assets, systems or patents matter most and, to a point, in extremely large global manufacturing organisations this is true. You could even argue that in production companies, physical assets such as property, oil and money maintain a value (albeit resale) even without people to manage them.

However, these are really exceptions to the rule. Knowledge, creativity and passion is a key differentiator for industries requiring advanced skills and expertise such as the mechanical and construction design sectors, particularly when it comes to success and winning business. This makes people a commodity that you cannot easily attach a value to.

While skills and knowledge are replaceable in the mid to long-term, there is a huge cost in terms of replacing staff and providing the necessary training and support to bring them up to speed.

## Investing in staff

Investing in staff on a regular basis is paramount to maintaining or obtaining a low staff turnover rate and motivating employees to invest more of themselves into their work; achievements that are vital for any successful firm.

I am not just talking about pay increases. We all like to receive a little extra at the end of each month as recognition for the work we do. However, enhanced remuneration packages offer a positive effect in the short to mid-term, even sometimes causing productivity levels to rise, but it never quite truly satisfies a person's longer-term aspirations and provides little, if any, benefit to the organisation — at least that is the theory.

## What employees really want

There is a school of thought that suggests there are three goals that the vast majority of employees desire at work: equity (dealt with above), achievement and camaraderie. It is these things that in turn help to maintain employee enthusiasm.

Camaraderie is prevalent to some extent in all organisations whether it is within smaller teams, offices or across entire businesses. If it were not then, there is a strong possibility that most, if not all, companies would suffer from high staff turnover.

Achievement is a slightly difficult goal to place a marker against because this varies enormously from one individual to the next. Achievement might be as far reaching as promotion to a management position, but might be more work-oriented such as helping to deliver a major project on time or finding the solution to a complex problem. In addition, many of us take for granted one of the biggest forms of achievement – learning and development.

The late American philosopher Mortimer Adler (1902–2001) once said, "the purpose of learning is growth, and our minds, unlike our bodies, can continue growing as we continue to live". So what greater achievement than to validate knowledge so that learning can be a continual process?

## Return on investment?

It seems obvious that learning new skills and knowledge is beneficial to carrying out tasks to a more proficient level, but the process of learning and the positive impact it can have not only on an individual but on an organisation is often taken for granted.

Pulitzer Prize winning poet and critic, Mark Van Doren (1894–1972), explains aptly: "Any piece of knowledge I acquire today has a value at this moment exactly proportioned to my skill to deal with it. Tomorrow, when I know more, I recall that piece of knowledge and use it better."

The biggest issue with learning is attaching a return on investment or financial measurement to the process. With tangible items such as new machinery, software or hardware, there is usually an identifiable financial measure be it more efficient production, error reduction or bringing outsourced processes in-house. When it comes to learning, there are no readily available facts and figures that can be drawn upon in the same way so some organisations remain sceptical when it comes to investing substantial sums in learning.

There is a new resource available that not only provides users with a clear learning strategy but also, to some extent, provides organisations with a way of attaching a return on investment against training. And, Autodesk, a major software house, is behind it.

## The Certification vision

Certification is not a wholly new venture from Autodesk. In fact, the programme has already been implemented successfully in a number of countries including the US and there are plans to expand this



across the world over the next few years. Even the concept is not entirely new, as various programmes with similar goals exist in the UK market, such as cadsmart.

Where Certification really differs from its competition is in its vision. For all intents and purposes, Autodesk Certification is just another form of CAD testing but a closer inspection shows just how much thought has gone into the whole process. Certification has a vision of continual learning — as Autodesk's core applications evolve so should the users, especially as so many users across the globe receive software updates as part of their annual subscription package.

## How does it work?

The program in the UK is currently only available for AutoCAD, AutoCAD Architecture, AutoCAD Civil 3D, Revit Architecture and Autodesk Inventor. The offering consists of four staged elements; two preparatory levels of testing designed as precursors to two levels of certification.

- Assessment Test: The entry-level test designed to assess user product skills, knowledge, and the suitability to sit the Certified Associate examination.
- Certified Associate: The first level of certification designed for those who have attended relevant training and have at least 100 hours hands-on usage.
- Practice Test: An application-based precursor to the Certified Professional examination designed to assess advanced user product skills and knowledge as well as providing a means of preparing the user for the type of examination they can expect.
- Certified Professional: The current top tier of certification, this application-based exam is aimed at testing the practical skills of users who have attended relevant training and have at least 400 hours hands-on usage.

This process is not just about CAD skills testing. It is about providing a clear learning path and acknowledging the skills and knowledge acquired along the way. Autodesk is promoting Certification as a global qualification/standard with all users regardless of localisation (language, measurements) undertaking the same examination process. Therefore, to complement the process and add further credence, there is a range of collateral that on successful

completion of the relevant levels allows the user, and indeed the organisation, to promote the talent within, including certificates and logos.

This is not a one-off process. Certification is release specific (although only available in the UK for the 2009 products) and passing the relevant exam(s) on any product is only valid for that release. Cynics might think this is a ruthless ploy by Autodesk to extract money on a regular basis but there are two things here that need to be considered.

Firstly, this really is a cost-effective package, therefore not a huge money-spinner for Autodesk; nowhere near as profitable as selling boxes of software or the subscriptions that go alongside these.

Secondly, without making Certification version specific and instead opting for a catchall test, the level of depth behind the examinations would have been so superficial that the validity of the results would have been tenuous at best, especially given the rate at which Autodesk is driving its products forward.

## What are the benefits?

There are a number of significant benefits that can be gained from Certification. Earlier we touched upon return on investment and the difficulties of calculating this for intangible items such as training. While Certification is not intrinsically linked to training, the process has much merit when the two are tied together. Certification can be used as both a precursor to training and as an indicator of its overall success.

One of the complexities of planning training for a large number of individuals is knowing precisely what is required to satisfy the entire groups' learning requirements. In most organisations, there is a variety of skill and experience and that diversity means a blanket approach to training can sometimes prove less than effective. Where Certification becomes useful in this instance is assessing knowledge upfront. In turn, this allows HR departments and CAD managers to source (either internally or externally) training that is more tailored to the needs of the individual.

Take for example an architectural practice in the process of adopting a new design tool, in this instance Autodesk's Revit Architecture. To first test the effectiveness of the product, a phased roll-out might be used with a small number of advanced CAD users forming a pilot group. These users to undertake a significant level of training, but that training might not be sufficient for this group to use the product in a live project environment. The implications of not delivering a project on time to a client or to an agreed standard could be very significant.

In this instance, Certification could serve as a means of assessing retained knowledge and highlighting areas where further help is required before any substantial level of work is undertaken.

Certification is also beneficial in the recruitment process. It is not easy to judge the skills and knowledge of an individual from a CV and face-to-face interview. Assessment could enable decision makers to identify suitable candidates, which in turn could reduce recruitment costs.

As the Certification Program expands in the UK, a base of users holding either Certified Associate or Certified Professional qualifications will form. This will provide recruiters with assurances that candidates do possess the skills and knowledge required.

## Positive impact on employees

If there truly is three goals that employees desire at work, and the first two (equity and camaraderie) exist, then Certification can also provide the opportunity to satisfy the third – achievement.

There are a whole host of genuine benefits an organisation can gain from Certification. These can range from benchmarking employee performance to providing motivation towards reaching specific targets, which could ultimately lead to financial rewards.

As an employer, such an investment demonstrates a commitment to the continual development of what is a highly-skilled and knowledgeable group of employees.

Enthusiastic employees significantly out-produce and outperform the average workforce because they are willing to go the extra mile and to do the hard or even 'impossible' jobs.

Sir Walter Raleigh (1554–1618), the great British explorer and writer, said: "The employer generally gets the employees he deserves." By investing in staff, the organisation benefits substantially in both the short and longer-term by retaining what are its most valuable assets.

***www.excitech.co.uk/atc9***

# Living on the strip

Forever looking at new ways to bring architectural projects to life, Liverpool design firm Uniform draws inspiration from a comic book film to help visualise a student accommodation project in Barcelona.

University accommodation was never this plush in our day, but 22@ The District, located in Barcelona, is the latest for young students looking for a high spec campus life in the Spanish city.

One of three Nido (meaning 'nest' in Spanish) developments, it joins two London-based builds. The promotional visualisations are brought to life through a comic strip of events by Liverpool-based design firm Uniform, and the project adds the vibrant cartoons of external artist Jamie McKelvie.

"Given the brief, a simple fly-through would have been adequate, however, Uniform wanted to take a more creative approach to ensure the films engaged with the youthful target market," says Laurie Jones, creative director at Uniform. "The films needed to appeal to an international audience with potential residents residing all over the world."

The team worked with 3ds Max and V-Ray for all the 3D elements, which were then composited in Fusion. For the comic elements Photoshop was used for re-touching, followed by AfterEffects for merging the 2D and 3D, and finally premier pro to edit it all together.

So, how was the experience of creating a fly-through comic book film? "It was pretty straightforward," explains Charlie Pastor, lead 2D artist. "The only slight technical challenge was the aligning of the composition of the characters for the 16:9 frame of the animation with the changing ratio of the comic frames. Once we got our heads around that it was easy."

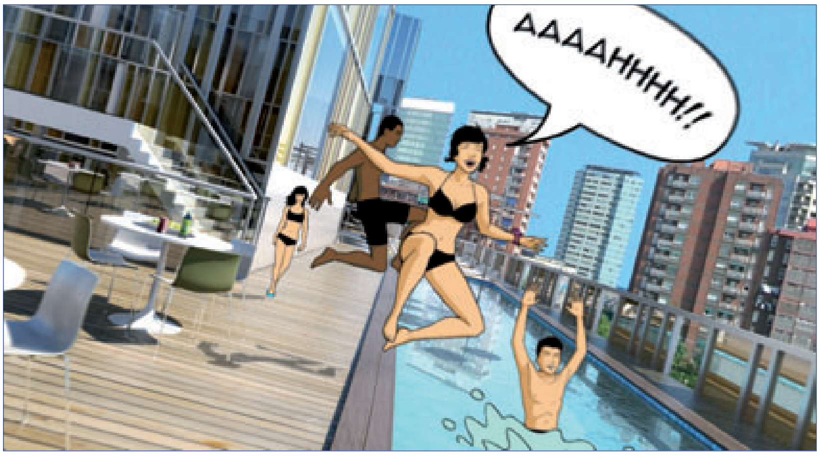
***www.uniform.net***



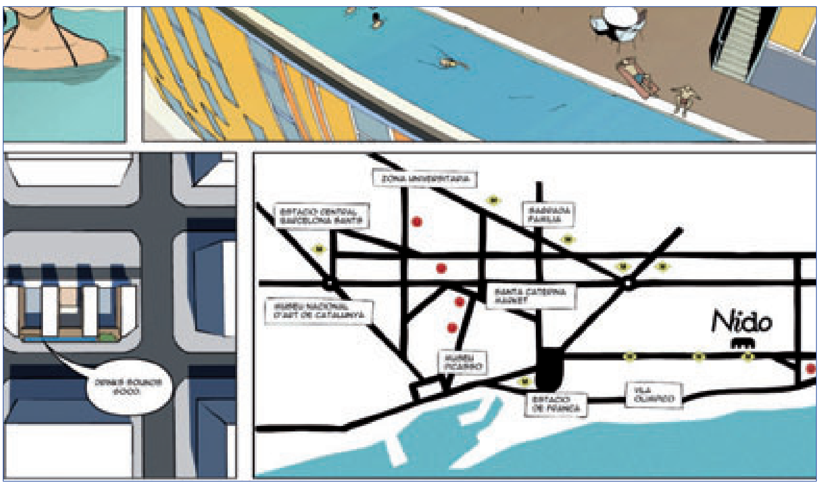





VOLVER


AAAAHHHH!!


AAAAHHHH!!
THIS IS GREAT!


ZONA UNIVERSITARIA
ESTACIO CENTRAL BARCELONA SANTS
SAGRADA FAMILIA
SANTA CATERINA MARKET
MUSEU NACIONAL D'ART DE CATALUNYA
MUSEU PICASSO
ESTACIO DE FRANCA
VILA OLIMPICO
Nido


HELLO!
GOOD MORNING. HOW ARE YOU ADRIANA?
I'M GREAT, THANKS!
YOU BETTER GET THAT. CATCH YOU LATER!
YEAH, BYE!
HI!
HEY! WHAT ARE YOU UP TO?
OH, JUST FINISHING THAT ESSAY FOR TOMORROW. HOW'S YOURS
S#$UT! I COMPLETELY FORGOT!
OOPS... BETTER GET WRITING.
COFFEE FIRST...
HI GUYS.
WE'RE OFF TO THE POOL. FANCY IT?
HEY, ADRIANA!
OH, HI!
WHAT'S HAPPENING?



# People who live in glass houses...

German design outfit 3delux creates a sensory explosion with a new events pavilion for glass manufacturer Leonardo.



**Leonardo's dream:** *The pavilion was created with a complex shape, built up through exterior glass panelling with flowing forms and reflections of curved footpaths.*



Now completed, it is hard to distinguish the intricate design visualisation from the real pavilion in Bad Driburg, Germany, built to house events for Leonardo, the glass and gift manufacturers.

A complex shape, built up through exterior glass panelling, with flowing forms and reflections of curved footpaths, make the results of this project all the more startling.

Having developed a number of temporary architectures and several virtual architectural concepts, the Leonardo Glass Cube is the first permanent building to be implemented by 3deluxe.

The firm worked with Bentley MicroStation 2D and 3D for the architectural design and implementation planning of the building, taking this information through into Softimage XSI 3D to produce the renderings and fly-through movies.

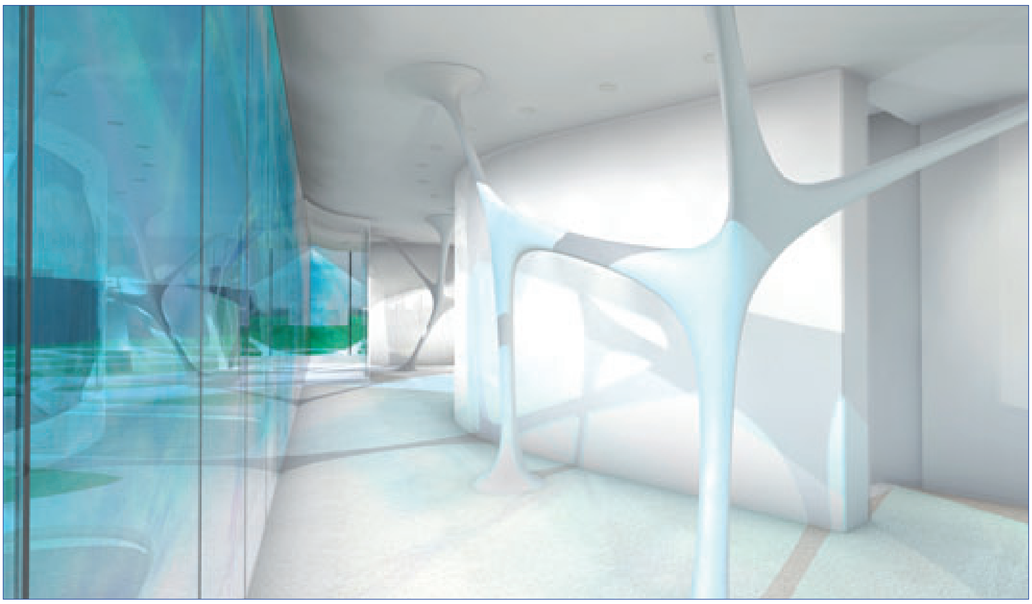
The company usually works with concepts that combine architecture, interior design, graphic design and landscape architecture as aesthetic entities. This example used CAD information heavily, not only for the architectural plans and rendering, but also to produce the preformed panels that were CNC milled off site for assembly.

Dieter Brell, head of 3deluxe in/exterior, points out that accurate CAM is not its first priority: "Our main focus is always on the sensory effects that the object has on the people interacting with it – both on their aesthetic and their tactile or acoustic sensibilities.

"On the side facing the façade, the material nature of the white surface is visually dissolved by means of a layer of gauze suspended in front. The natural daylight pouring in produces dazzling moire effects in the translucent fabric's delicate texture, which in turn are reflected in the glass façade."

The six metre high frameless glass panels are fitted with disc springs to reduce stress from wind pressure, producing a glass box that will bend, but hopefully, not break.

***www.3deluxe.de***



**Inside out:** ***The building allows natural daylight to pour in.***



***The use of inverse kinematics enabled the optimum location of pylons and the chain of bridge sections that link them together into a 200m tree top tour at Kew Gardens.***

# Up-up and away

London-based Marks Barfield architects is using Gehry Technologies Digital Project (DP) technology to enhance tourist attractions in this iconic world city.

Located on the bank of the Thames as it flows through one of the world's leading tourist cities, the London Eye is an iconic and world-renowned structure.

The Eye was designed and recently sold by Marks Barfield architects. The London-based firm is well-known for its iconic designs. It was instrumental in the newly-opened Treetop Walkway at Kew Botanical Gardens and is currently working on an 170 m vertical pier on the Brighton seafront, where the popular and historic West Pier was previously located. A circular chamber will raise 170 people at a time to thrill at the spectacular views that i360, as it has been named, offers.

The company combines design creativity and engineering in ways that attract millions of visitors to the UK every year. Chris Smiles, associate at Marks Barfield, explains: "Our practice develops unique propositions that combine multiple and interconnected functions of design, engineering, commercial and structural considerations including ground engineering, aerodynamics and deflection along with support analysis and complex mechanisms."

The firm uses Gehry Technologies Digital Project (DP) technology, supplied by UK VAR, Desktop Engineering. Chris Smiles says: "We have been using Digital Project for two years and found that its parametric functionality allows us to rationalise designs taking all of these considerations into account. This is crucial because our designs have a primary reliance on mechanical and structural analysis and because of this, a great number of changes inevitably occur before a final solution is achieved."

## Group ticket

Marks Barfield has seven employees trained to use DP and has benefited from support in this and other routes to best practice from Desktop Engineering (DTE) which, with its multi-industry customer base is able to deliver the most appropriate methods from aerospace and automotive engineering to the AEC sector.

DTE managing director Geoff Haines says: "DP was developed from Dassault Systèmes Catia technology by Gehry Technologies to deliver advanced design-to-manufacture technology to architects and structural engineers. It is enjoying considerable success among leading practices including Arup, Zaha Hadid, SOM, Allies and Morrison, where parametric 3D-based model technology secures a better outcome from better designs."

Having produced a finished design DP is used to communicate to fabricators, contractors and detailers using formats best-suited to their work practices.

**"Accurate and timely communication of design iterations and their impact on the final form allows us to make better decisions that are based on more complete and precise information."**
**Chris Smiles,** ***associate at Marks Barfield***

Designer, Yan Gao spoke about this aspect of the process: "The ability to communicate to our supply chain is crucial to ensure that our design intentions are realised in the final structure and that inputs from consultants are efficiently rationalised and communicated in the design."

Chris Smiles adds: "Accurate and timely communication of design iterations and their impact on the final form allows us to make better decisions that are based on more complete and precise information. This provides more design options and greater flexibility. DP effectively keeps you in the picture."

## Branch and root review

One example of the efficient use of DP is found in the development of the Kew Gardens Tree Top Walkway where the use of inverse kinematics enabled the optimum location of pylons and the chain of bridge sections that link them together into a 200 m tree top tour.

There were many constraints in the project not least having to avoid damaging the roots of nearby trees, which had been previously mapped using radar. The parametric capabilities of DP allowed the design elements to act in a symbiotic relationship. This enabled the designers to move one element and have others react to the change logically and within the design constraints that the overall scheme demanded.

DP methodology also allowed the walkway's bill of materials to be reduced through standardisation of components and this in turn reduced project completion time to just nine months.

Yan Gao says: "Our experience of DP is that it increases design productivity by 30 percent to 40 percent, allowing us to meet tight deadlines and bring in contractors much earlier than otherwise possible.

"That enables concurrent working practice by allowing contractors to start their work sooner.

"This brought particular dividends in the design and fabrication of the complex trifurcated pylon design, which could not have been easily resolved using traditional methods since it required input from several parties and resulted in many design iterations. Without DP this would have demanded a much greater resource and increased the total project cost."

*The treetop walk at Kew Gardens had many constraints, including avoiding damaging the roots of nearby trees.*



Another example of the benefits that have been derived from this technology is found in the Rhizotron — a subterranean space that allows visitors to see tree roots. Its inclined concrete surfaces could not be communicated using traditional techniques. With DP and its 3D imagery the building's fluid lines could be understood and built without compromising the design.

Marks Barfield is making full use of DP to design and build more attractions on a grand scale; i360 being next. As a practice that has strongly focussed on sustainable design DP helps by enabling a better use of resources with less waste, facilitating designs that reflect and communicate this vision.

***Desktop Engineering: www.DTE.co.uk***
***Dassault Systèmes: www.3ds.com***
***Marks Barfield: www.marksbarfield.co.uk***


AX CINEMA
LONDON





# CADline helps Price & Myers put its CAD in order

Reseller helps leading structural design firm develop best practice.

Price & Myers is a forward-looking and innovative company. However, sometimes even successful firms can unintentionally overlook license housekeeping. Employees get tied up with projects and are too busy to organise upgrades and implementations.

That was the situation that Koal Bhogal discovered when he joined consulting engineering company Price & Myers as senior CAD technician three years ago. The company's position regarding an upgrade strategy was, in his words: "in need of a total rethink".

Working with Autodesk Premier Solutions Provider CADline, Mr Bhogal has 'modernised' Price & Myers' subscriptions and software licences policy. Now, fully under control its CAD technicians have access to the latest versions on release – a particularly important element of the company's pioneering work with Revit Structure.

"From my experience, if companies don't keep up with the latest software versions, when they do need to upgrade, there's a huge learning curve for everyone – the whole organisation suffers and there's a noticeable drop in production," says Mr Bhogal.

"Now there's no worry of having to find a huge lump sum in, say, three years time to bring the firm up-to-date," he says.

## Hands-on support needed

Price & Myers is responsible for the structural design of approximately £500 million of construction annually. Its work covers an unusually wide range, both in size and type and projects vary from minor alterations and extensions to major new buildings and refurbishment projects.

It's the type of company where an informal, ideas-focused atmosphere encourages innovation. As a result, its multi-disciplinary team is able to make a positive contribution to projects at an early stage when engineering input can often help to achieve an elegant and cost-effective solution.

With so much going on, it is no wonder that something had to give. Bhogal discovered when he joined the company that he was responsible for solving that 'something' – the licence question.

"When I began here we had a complete range of different CAD software – and particularly Autodesk CAD software. We had AutoCAD LT and different versions of AutoCAD from release 14 onwards. We had 20 seats of AutoCAD 2005 – but even though we had copies of 2006, they hadn't been installed. It needed someone to take a step back and evaluate what we had and then make best use of the existing licenses."

Mr Bhogal had worked with CADline in his previous job. "I like their hands-on attitude. They offer a personal service rather than a call centre – and a dedicated account manager. They're far more than a 'boxes off the shelf'-type reseller and can always resolve a problem.

> **"It's great that every time there's a new release we can start taking advantage of it straight away, if we need to. Consequently, I don't have to present the case for investment which, however valid it may be, always takes time and energy."**
> **Koal Bhogal,** ***senior CAD technician, Price & Myers***

"First, they did a lot of research for us, finding out which licences could be upgraded or made live again.

"Then I realised I would need to sell the idea of subscriptions to the partners and set about putting together spreadsheets and developing a long-term strategy. With CADline's input, I was able to show that subscriptions made budgeting so much easier. If all our software was on subscription we would be on top of it all and not have to worry about being hit by a huge bill when upgrades became essential."

Flexibility in upgrade choice was a key driver. "Just because a new version of software is available, you don't necessarily have to install it immediately – you can test it and decide when to implement. So, you still have freedom of choice," Mr Bhogal says.

"However, it's great that every time there's a new release we can start taking advantage of it straight away, if we need to. Consequently, I don't have to present the case for investment which, however valid it may be, always takes time and energy.

"Obviously at certain times there are other budget priorities and you could get into a situation where mentioning a CAD upgrade became a taboo subject, however badly it was needed. However, it is no longer a case of balancing needs."

With CADline's help, Mr Bhogal is playing a key role alongside Revit technician Jack Walshe in Price & Myers' roll-out of Autodesk Revit Structure. "It's gradually being distributed across the company and the feedback is good, with engineers and technicians reporting that it solves many of the problems that dog other solutions."

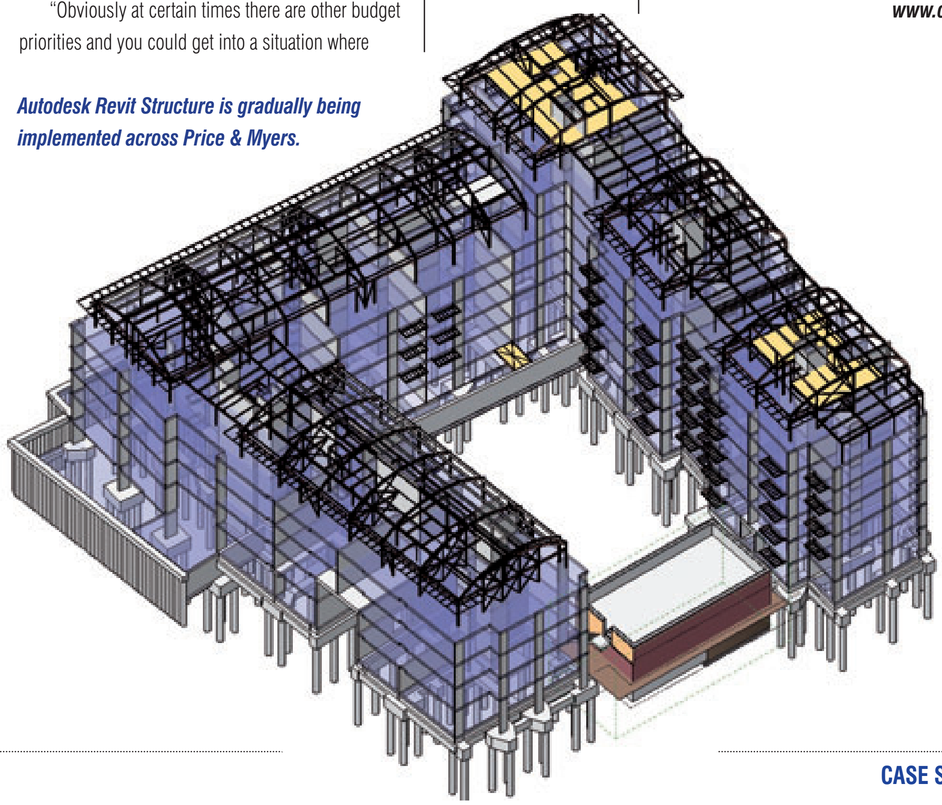
Price and Myers is now at the forefront of Revit implementation in the UK, with close to 30 Revit seats across the organisation.

Recognising that the implementation of the software and the gradual move towards building information modelling (BIM) needs to be carefully managed, Mr Bhogal has created a CAD Development Group with representatives from each department. This team is responsible for maintaining standards and deciding when new versions of Revit and AutoCAD are implemented. "Switching to Revit has had its teething problems, but we're ironing out the 'transition problems' as we go along and are now seeing the benefits."

As a result, Mr Bhogal believes he is able to keep the firm's CAD cost of ownership at a very favourable level. "On average, each CAD station is now costing around £38 per person per month, which, when you consider what you get for that, is very reasonable.

"We're gradually developing best practices – and the good thing is, it's actually motivating staff. They are really glad to be learning something new and keeping up their skills," he concludes.

***www.pricemyers.com***
***www.cadline.co.uk***



***Autodesk Revit Structure is gradually being implemented across Price & Myers.***

# A fitter shop fitter

AM System UK uses BIM to design Sony stores.

AM System UK is using the latest in 3D building information modelling (BIM) techniques to effectively design and deliver all sizes of store and concession for client Sony and other leading electronic goods, sports and footwear retailers. Projects range from small concessions within shops to flagship Sony Centres, such as the one recently opened in Heathrow Terminal Five, and innovative uses of unusual sites such as Scotch Hall shopping centre in Drogheda.

AM System UK is not an architect: it is a retail fit-out and manufacturing company. "Retail interior design is no longer simple shelving systems," says Helen Morse, design department manager at AM System UK. "Shop interiors are becoming far more sophisticated and architectural.

"This means we need to have more control over our designs and we have to be able to explain their intricacies to the client in a way that is easy to understand. 3D design enables us to model the space and design the store with amazing accuracy: it also allows the client to see clearly what they'll be getting right from the start."

## 3D allegiance

Based in Leicestershire, AM System UK has been operating for 50 years and was originally part of a Danish company. As digital design took off the Danish operation worked on AutoCAD. However, AM System UK investigated its 3D design capabilities and found that converting from 2D to 3D proved time consuming.

Although many of its sub-contractors and some architects still work in 2D, AM System UK has been a user of ArchiCAD's 3D model-based design capabilities for some time.

Helen Morse says: "We found that Graphisoft's ArchiCAD software was far more efficient and easier to use when converting from 2D to 3D. Its design capabilities are also of paramount importance. Even when an architect supplies us with 2D data for the shell of a retail unit we remodel it in 3D before designing the store inside it. The work then progresses seamlessly from concept to detailed design stage using the same 3D model, and, if contractors need 2D drawings we simply output them, and any required detail data, from the model."

## Plain sailing

One example of the benefits of this approach is AM System UK's long-running store design relationship with Sony. The electronics giant has opened a flagship store in Heathrow Terminal Five and its innovative design has been made possible by the unique communicative abilities of ArchiCAD.

"The T5 store is very different to any other," says AM System UK's senior designer Julian Collinge. "Its design is based on the idea of a technology garden: an experiential area where travellers can interact with products and get information on Sony's latest film and music releases, too."

Not instantly recognisable as a shop, the store's design uses elements such as a glass floor and technology trees — 2.1 m high data/power connected stands showcasing the latest mobile phones, computer games and gadgets – none of which is the norm in the regimented world of airport retail interiors.

"ArchiCAD's 3D capabilities enabled us to explain to both Sony and British Airports Authority (BAA) that the design would look good and be of no danger to the public in an emergency," says Collinge. "We had to show that the stands wouldn't block sight lines; that the glass floor could be reconfigured easily; that the space would work visually from all perspectives." AM System UK did this by creating a fly-through in ArchiCAD of the space and its surroundings. The designs were approved on aesthetic grounds and also met all BAA airside security/safety checks.

"Our concept model, which first sold our ideas to Sony and BAA, went on to become the full store design. Using BIM we are able to evolve the model, modifying and adding to it as the project progressed. At Heathrow it was used at all stages of the design including getting approvals from the airport authority," says Collinge.

"This way of working is really beneficial because it enables you to see the link between the design and the finished store. ArchiCAD enables us to create a progressively more detailed model that is the centre of all decisions. It negates redrawing the design following each amendment, cuts out misunderstandings and means that we alleviate problems with the client or planners not knowing what they are getting until it is built."

## From big to small

In contrast to flagship projects such as the one at Terminal Five, AM System UK also undertakes the design and manufacture of smaller but no less challenging stores such as the 80 sq m Sony Centre in Scotch Hall, Drogheda.

**"There will always be those in construction who are more comfortable working in 2D but if you want to connect properly with – clients, planners and sub contractors – 3D model-based design is definitely the way to go."**

**Julian Collinge,**
*senior designer, AM System UK*




*Sony's flagship store in Heathrow Terminal Five. Its innovative design has been made possible by the unique communicative abilities of ArchiCAD.*

The Scotch Hall store has been widely acclaimed for its innovative design that strays outside of the conventional retail unit layout. "It was a particularly challenging site to design a store for," says Collinge.

"Set against a Grade One listed stone wall and with a 20 m high ceiling, the store is like no other and it was only through using 3D modelling that we could fully explain our concept to Sony, the retailer and the shopping centre manager.

"At first people were sceptical but by working through the ArchiCAD model with them, we were able to show how we'd design around the listed façade and provide the necessary services without running them above a ceiling as is normally the way.

"AM worked with the client and safety inspectors to design and then amend the 3D model to alleviate fears about things including fire safety and security. We created a fly-through and also interrogated the model to ensure that there were no services clashes. It all worked out perfectly."

## Making concessions

Concession displays within department stores are a big part of Sony's national coverage but they are only small in terms of size. "We have to be able to roll them out quickly and cost efficiently," says Morse.

"Our solution is an ArchiCAD conversant sales/design person, who goes to site, surveys, designs and costs a concession on the spot. The clients love it because they can see the process and get to navigate through the model to see the view from the checkout or positioning of stands, for instance. For us, it saves immense amounts of time and often pulls in extra work, as the clients ask us to design other parts of the store.

"It is this ability to sit in front of clients or hold on-line design sessions to work through a design that is probably the most important part of ArchiCAD for me. The software is easy to use, the client can understand 3D better than 2D, we can work out problems quickly and easily, the client enjoys the interactivity and the feeling of having input into the design, and, if they want us to experiment with the design we can do it there and then."

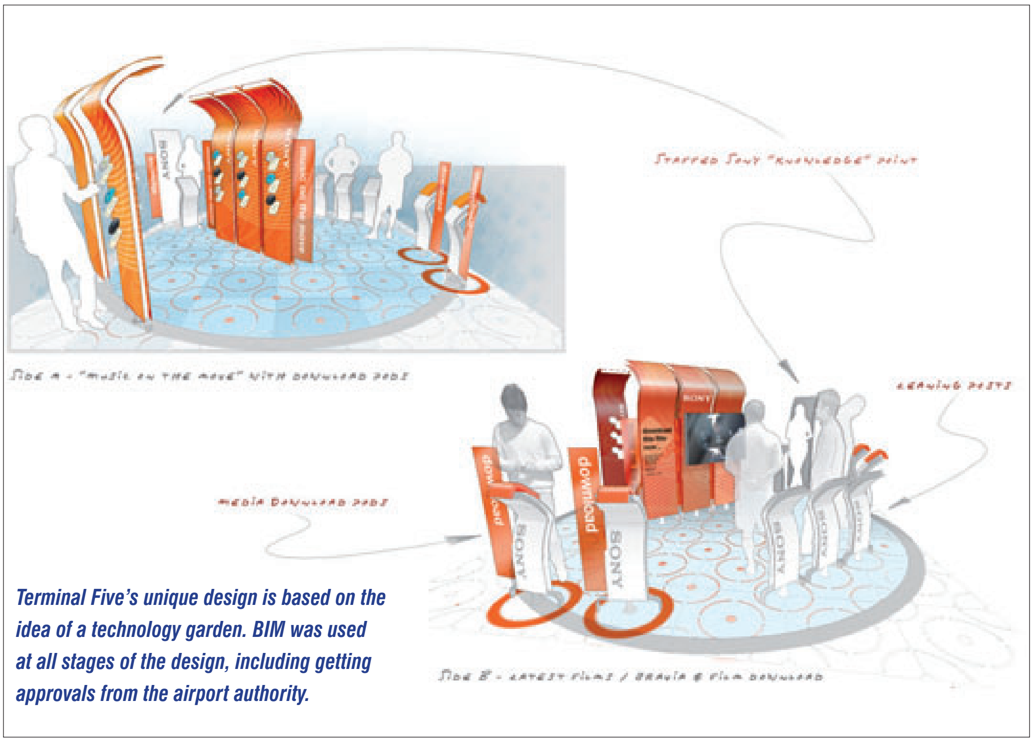
Collinge says: "We aren't architects and we don't use some of the features of ArchiCAD that they do. However, 3D model-based design is integral to the way we work and our success. There will always be those in the construction industry who are more comfortable working in 2D but if you want to connect properly with everyone – clients, planners and sub contractors – 3D model-based design is definitely the way to go."

***www.amsystem.co.uk***










***Terminal Five's unique design is based on the idea of a technology garden. BIM was used at all stages of the design, including getting approvals from the airport authority.***

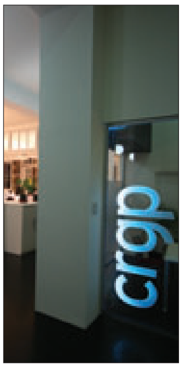
# Realising design potential with AutoCAD Architecture

Glasgow-based consultancy CRGP has re-invested in AutoCAD Architecture, writes **Richard Mitchell,** marketing executive, Excitech.

Formed in 1964, Glasgow-based CRGP is a multi-disciplinary construction consultancy that specialises in architecture, building surveying, quantity surveying and project management. The firm operates with a keen eye on sustainability, environmental factors and health & safety.

As well as being Quality Assured, CRGP is also recognised as an Investor in People for its continued investment in employees including training. To complement this staffing investment, the practice has always strongly sought to utilise the most suitable of CAD design tools to enhance client projects and provide a competitive edge during the design process.

To support this, CRGP's architectural team is provided with Autodesk Architectural Desktop 2005 (now AutoCAD Architecture) and AutoCAD LT, while other departments within the company used AutoCAD LT for less design-orientated tasks.




Gary Forster, Associate at CRGP, explains that "when we were looking to purchase a new design tool in 2004, the price of Architectural Desktop (ADT) was comparable with AutoCAD, so we made a conscious decision to purchase ADT with the intention of exploring its architectural functionality at a later date. Due to the increasing volume of work and imminent deadlines that later date never materialised, and consequently the architectural team never used any of the additional functionality above and beyond that included in standard AutoCAD".

Despite having invested in AutoCAD regularly since 1989 CRGP realised in 2006 that it needed to fully review its CAD software as its then-existing software release was soon to be retired by Autodesk. CRGP discussed at length with its CAD supplier at the time the possibility of implementing Revit technology in place of ADT and received advice on best practice for software roll-out and implementation.

Recognising the substantial sum of money needed to invest in Revit as well as other set-up costs such as training, CRGP decided to seek a second opinion and contacted Excitech.

Following a number of demonstrations of the entire Autodesk Architectural platform, CRGP realised that the functionality required might already exist in ADT and decided to look further into utilising its existing software.

"Once we were reminded of what ADT was actually capable of and saw all the additional functionality that had been added since we made the initial software purchase, it presented us with another option and a difficult choice to make," explains Mr Forster.

"We were becoming increasingly aware of the





groundswell of support Revit was receiving from within the industry and the perceived benefits it could bring to the company, but at the same time realised the implications that adopting this could mean for the business. Moving to a Revit environment would have meant a financial investment not only to replace the entire company's CAD software but could have meant a significant upgrade of our IT infrastructure and of course the necessary training and support."

Having seen the various presentations from Excitech, Mr Forster decided Revit was a less viable option than better utilising the existing software investment in ADT for a number of reasons. "It was absolutely critical that, regardless of choice, the entire design team across all divisions were able to work on the same design platform, be it DWG- or RVT-based.

"We were also conscious that DWG was and still is considered the industry standard and that a number of partners may not be able to collaborate with Revit drawings. Finally, given workloads and the number of imminent projects we could not justify or afford for drawing production to cease while training and implementation was undertaken on a whole new software platform.

"As a company, we were keen on a BIM solution, but when the Architectural team saw what ADT could achieve while still being in the traditional AutoCAD environment the decision was ratified," says Mr Forster.

## Best use of technology

Having decided that re-investing in ADT was the most logical choice, CRGP undertook a significant software upgrade including all licences of AutoCAD LT and subscriptions. Excitech was tasked with protecting the company's then soon-to-be retired software investment and to continue to provide its design teams with the latest design tools.

For CRGP it was essential that, having committed to investing in ADT, the product's functionality and capabilities were explored in more depth.

"We wanted to use ADT as ADT. That sounds odd, but we had only ever used the product as AutoCAD. Following a number of discussions with Excitech, a range of areas where we could focus were highlighted to ensure that we would get the most productive use out of the software.

"These included improving the output of drawings and renders for presentations (including using 3D functionality), standardising drawing and presentation styles and exploring some of the key architectural features in the software," explains Mr Forster.

"Excitech carefully analysed the requirements of CRGP creating a bespoke training programme aimed at delivering various levels of training throughout the architectural team. From the outset, CRGP identified the need to create a group of CAD Co-ordinators; in essence evangelists who would gain a more in-depth product knowledge than general users. As well as gaining a high level of proficiency, the CAD Co-ordinators would provide input into the ongoing use of ADT within the company and deal with support issues as and when these arose."

## Supporting with training

A bespoke one-day AutoCAD/LT update training course was provided to the entire design team (36 users) to enhance their understanding of new features added since the last purchase. Specific product training then followed, which focused on the company's 21 ADT users (divided into small groups) in the form of two one-day training sessions. The CAD Co-ordinators then received two further days training on system configuration and project configuration.

"Feedback from the training was good," says Mr Forster. "People came away from the training feeling positive about what they had learnt and were excited about the prospect of applying this."

Following on from the training, the architectural team commenced work on a three-storey commercial project, which CRGP felt was suitable to trial using the newly-learnt skills, and while some of the functionality learnt was not utilised, the final result was a 3D model that could be used to present concepts to the client and gain feedback.

"The initial project gave us the opportunity to cut our teeth with ADT," says Mr Forster. "Having completed the project we noticed a number of major advantages, particularly in terms of time savings during the conceptual modelling stage.

"Previously, conceptual work was completed using Google SketchUp or Autodesk VIZ, but this meant that everything had to be re-drawn and scaled to create an accurate CAD model. With this project, we used ADT to produce all the conceptual work and once we started using the tools we realised that what had previously been done in SketchUp or VIZ could be done just as quickly in ADT," explains Mr Forster.

## Moving forward with ADT

CRGP continue to view ADT as a long-term investment despite working on a number of projects. "It's not the sort of thing you can use effectively overnight. It's a gradual process and the more you can understand the more you can push forward with things. We're hoping to roll out CAD Standards within the next three to six months and will be working with Excitech on developing these.

"Throughout the process Excitech has been incredibly helpful. For us, it has not just been about the training, but the whole service we've received. Whenever problems have occurred, or guidance has been needed, we have been able to work with Excitech to resolve these. It means for us that it is not just a business transaction but an ongoing relationship," explains Mr Forster.

The decision has been made to extend the basic AutoCAD training through to the company's building surveyors team. Mr Forster explains: "We saw the benefits it had brought to the architectural team and saw no reason why this should not be extended. As an Investor in people we have an ongoing commitment to invest in our staff and we see training as a good way to retain our highly talented staff. Our previous experience has shown that training has empowered and encouraged our staff as well as making them more productive, which can only be a good thing for any company."

***www.crgp.co.uk***
***www.excitech.co.uk***

**"We wanted to use ADT as ADT. That sounds odd, but we had only ever used the product as AutoCAD. Following a number of discussions with Excitech, a range of areas where we could focus were highlighted to ensure that we would get the most productive use out of the software."**
**Gary Forster,** ***Associate at CRGP***

# Quantifying CAD efficiency
## in an integrated engineering environment

Productivity metrics ensure innovative projects are delivered on time and within budget.

Ramboll Whitbybird has established an enviable track record for its flair, style and innovation in landmark and iconic buildings. A global business of 7,500 employees with a portfolio that includes energy, water, environment, consultancy, and management services, the firm consistently invests in IT and management systems so innovation remains at the core of everything its engineers create.

Streamlining design, management and delivery led Ramboll Whitbybird to early adoption of 3D modelling because of its higher productivity and better and more accurate knowledge exchange. One of the most exciting and challenging projects where 3D modelling has been effectively utilised is the Ferrari Experience, a Ferrari-branded theme park and high-end resort destination in construction on Yas Island in Abu Dhabi, United Arab Emirates.

With its complex and distinctive central building derived from the classic double-curve of the Ferrari body shell, Ramboll Whitbybird drew on all of its experience in designing complex building forms and innovative engineering solutions to meet the 24-month fast-track programme.

The juxtaposition between complexity of form and simplicity of construction required that supporting software and technical infrastructure be capable of high-end form resolution and structural rationalisation through high-quality and efficient drawing production.

MicroStation, Bentley Structural, and Generative Components were used at every stage of the project to enable work to be shared between the UK offices in London, Birmingham and Bristol. Approximately eight gigabytes of data was consistently being co-ordinated among the offices, with drawings produced in all offices and extracted directly from the multiple Bentley Structural models. The iterative redesign of taking façade geometry, which was being revised during the frame design, was made possible due to the seamless interoperability of the software and the inherent spatial co-ordination this provided.

*With its intricate and distinctive central building derived from the classic double-curve of the Ferrari body shell, Ramboll Whitbybird drew on all of its experience in designing these complex building forms.*

"Bentley has enabled our continued development in technology use. With these tools, we have been able to streamline our approach to integrated engineering benefiting all aspects of the business," explains Andy Collingbourne, Ramboll Whitbybird chair of the advanced 3D modelling group.

### Measuring CAD performance

Growth within the practice has raised a number of logistical challenges for the team at Ramboll Whitbybird, particularly in the areas of team development and recruitment. To help apply some metrics in these key technical areas, Ramboll



Whitbybird subscribed to the UK-based CADsmart CAD skills assessment service, which provides independent benchmarking data on CAD performance for in-house personnel and new staff. This proved critical when working on flagship projects, where effective use of CAD technology is crucial to successful project delivery.

CADsmart software is compatible with MicroStation, acting as a plug-in to the CAD environment without affecting existing configuration or setup. Users see 10 randomly generated questions, each covering a different aspect of basic CAD skills. The questions are easy to follow and candidates are shown an exemplar window of the final drawing they are expected to produce.

Scoring is automated and users receive a certificate with a detailed breakdown of stage scores and times, together with feedback on any dropped marks. The software looks for an accurate end drawing, but doesn't penalise candidates for the keystrokes or commands they use to achieve the desired end result. The average national score for an assessment is 65% in 74 minutes. Experienced users should score higher (80% or higher) in less time.

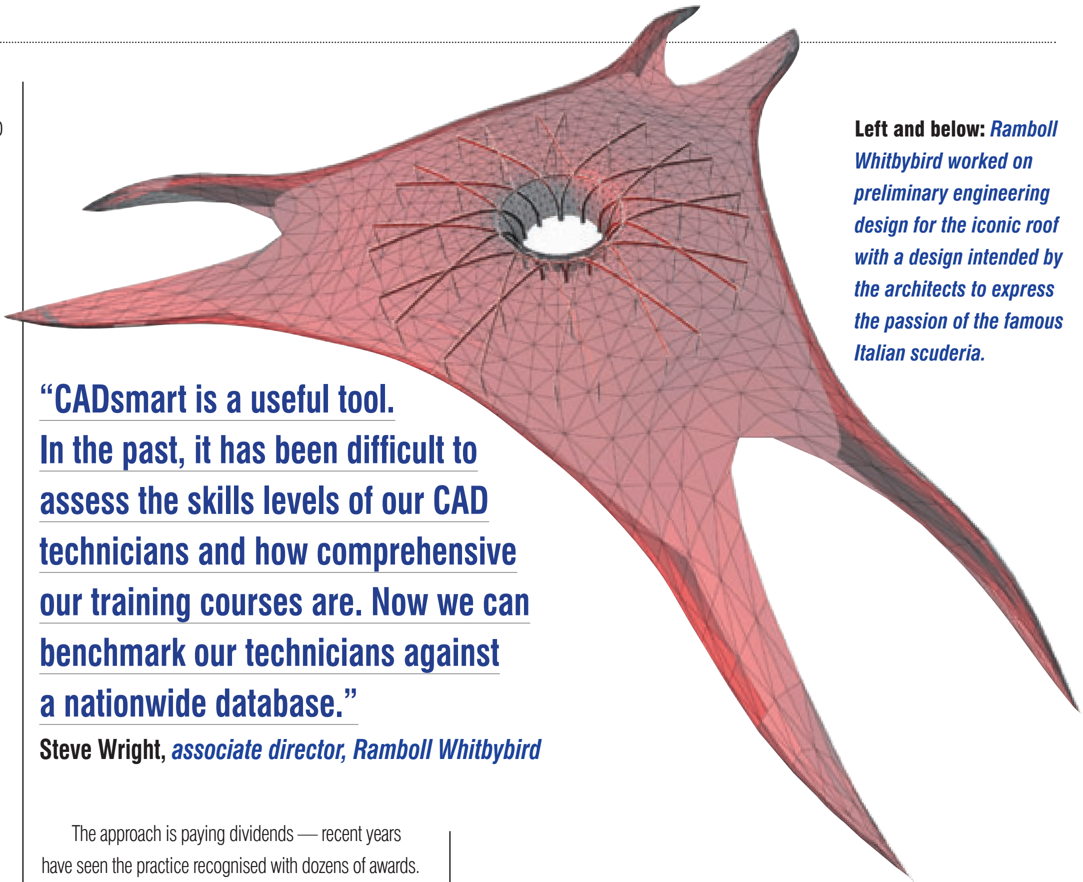
First, Ramboll Whitbybird organised a programme of assessments across 10 locations in the UK to establish a base benchmark for basic CAD performance on MicroStation software. For a firm of this size, the initial Ramboll Whitbybird benchmark was extremely encouraging, exceeding the national averages across a number of categories.

That data has enabled the practice to monitor the CAD skills of potential recruits and plan a more appropriate induction for new staff, depending on their skill levels. It has made the resource allocation determinations of projects clearer, as the practice can tell from day one where people will fit into the existing project team infrastructure.

The service also feeds into a continuous learning environment for Ramboll Whitbybird staff, as it highlights specific areas where users can benefit from developing new CAD skills. In addition, it dovetails into the firm's annual appraisal process — allowing staff to demonstrate improvements year-on-year.

With an increasing focus on 3D modelling and building information modelling (BIM), it is especially important to quickly identify basic skills among users before embarking on more complex design and production processes. Steve Wright, associate director, Ramboll Whitbybird explains: "CADsmart is a useful tool. In the past, it has been difficult to assess the skills levels of our CAD technicians and how comprehensive our training courses are. Now we can benchmark our technicians against a nationwide database. In fact, we were pleased to find that we are above the national average. And by reviewing the results of the assessments, we can hone in on areas that our technicians may need some additional training."

He concludes: "At Ramboll Whitbybird, we cross-train the majority of our new CAD technicians to use MicroStation. After three months we use CADsmart to assess how successful the training has been and how well the users have picked up the new software."



**Left and below:** ***Ramboll Whitbybird worked on preliminary engineering design for the iconic roof with a design intended by the architects to express the passion of the famous Italian scuderia.***

## "CADsmart is a useful tool. In the past, it has been difficult to assess the skills levels of our CAD technicians and how comprehensive our training courses are. Now we can benchmark our technicians against a nationwide database."

**Steve Wright,** ***associate director, Ramboll Whitbybird***

The approach is paying dividends — recent years have seen the practice recognised with dozens of awards.

## The Ferrari Experience

The world's first Ferrari-inspired theme amusement park is part of a new leisure destination known as Yas Island. It forms part of the Abu Dhabi expansion, a strategic hub located between Europe and Asia on the northeast coast of the Arabian Peninsula.

The leisure oasis covers 25 sq kms of desert, with a beachfront shoreline of some 30km. Three main elements are planned: a theme park called the Ferrari Experience, a retail complex covering 300,000 sq m, and a motorway track suitable for Formula One racing.

The Ferrari Experience will include 24 Ferrari-themed attractions, a test track, and Ferrari driving school. Ramboll Whitbybird worked on preliminary engineering design for the iconic roof — a 90,000 sq m dome covering 200,000 sq m of internal floor space — with a design intended by the architects to express the passion of the famous Italian scuderia.

The engineering of the theme park's floor slabs — plaza, ground slab, and mezzanine — required close co-ordination with the specialist designers of the attractions. Structural analysis involved the calculation of the static and dynamic loads deriving from rides that include water plumes and roller coasters.

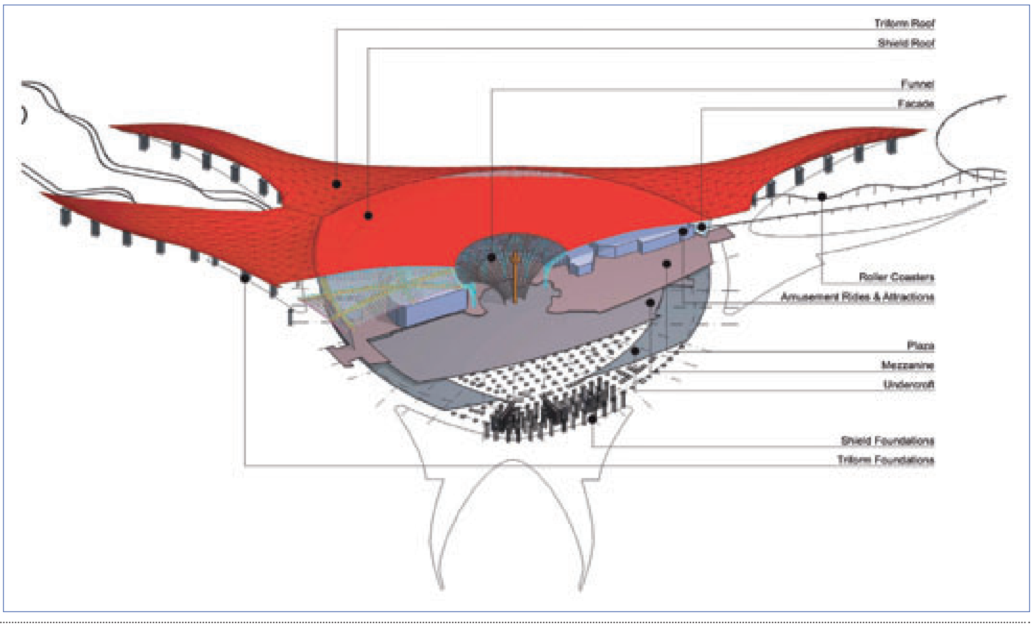
With its complex and distinctive central building based on the design of a classic Ferrari wheel, Ramboll Whitbybird needed to design a complex form but keep it relatively simple to construct.

Capable of high-end form resolution, structural rationalisation, and efficient drawing production, Bentley's integrated software — including MicroStation, Bentley Structural, and Generative Components — streamlined the firm's approach and provided benefits across all aspects of the project.

***www.rambollwhitbybird.com***

***www.cadsmart.net***

***www.bentley.com***



# Model behaviour

Dimension 3D Printer helps build success at Paul Davis +Partners.

Busy architect and urban design practise Paul Davis + Partners is used to juggling multiple projects and time constraints are often an issue. Its clients are demanding more projects to be turned around at an increasing pace, which means that the firm has had to reassess some of the ways it was working to meet deadlines.

Until quite recently, the more traditional methods of hand-made cardboard or balsa wood models were being built at the end of the design process so as not to hold up the project. Having visual models available only at the end of the process meant that most of the projects were relying solely on drawings and therefore missing many of the benefits that 3D models can offer.

"It is much more beneficial for 3D models to be used throughout the design process in order to assess the structure and shape of the building," says David Hoggard, partner and architect at Paul Davis + Partners. "A tangible model can help us to determine where sunlight will hit the building, for example, and to consider the spacing between buildings, ensuring that the clients and architects are both happy with the end result."

Outsourcing its model-building was one option the firm explored, however past experience had shown this method to be too costly and less flexible than having its own facilities in-house. Instead, Paul Davis + Partners made the choice to invest in a 3D printer that would easily produce a highly durable model in a matter of hours, rather than the days or weeks that it would take to build by hand.

The firm selected the Dimension SST 1200es 3D Printer for its precise detailing and use of ABSplus materials. The other solutions it considered did not have the high quality material properties or accuracy that the Dimension printer offered.

Since its arrival in May, the Dimension printer has been continuously running, with the exception of one week's rest. It has enabled models to be constructed throughout the design process, helping Paul Davis + Partners to be more creative and giving the firm the freedom to test its designs throughout the initial phases of the projects. There is no substitute for the tactile and visual feedback a physical model can provide – and with a Dimension 3D printer the company can create both simple and complex models that are proportionately scaled.

David Hoggard explains: "The printer has saved us a huge amount of time and has given us the opportunity to take on more projects. It recently made a project in the Far East possible for us. We were asked to come up with a design and produce a 1:500 scale model within the space of four weeks. It would have been impossible to meet the deadline without the Dimension printer, as outsourcing to a model making company would take two weeks as a minimum. Using the Dimension printer is like having an extra member of staff.

"Our clients are giving us less and less time to develop projects and, in the Far East, they tend to work 24 hour days, so UK architects have to be incredibly efficient to compete. The Dimension 3D printer allows us to communicate and collaborate without ambiguity and the ABS models enable everyone to review concepts accurately.

"I'm constantly amazed at how good the printer is and the detail it can achieve. We weren't quite prepared for the results it can produce," says Hoggard. "The implementation process went smoothly, delivery of the printer was taken in the morning and by lunchtime, it was up and running with only half an hour of training time required."

The Dimension 3D printer is a good illustration of Paul Davis + Partners investing in new and innovative technology and is proving to be a good method of recruitment for the firm. It helps to attract young architects who see the potential that the technology can bring to the industry. In future, Mr Hoggard aims to keep the printer as busy as possible, changing the culture of the office to use the printer rather than keeping designs on paper, which will allow Paul Davis + Partners to continue to grow its business.

Mr Hoggard concludes: "Eventually the Dimension 3D printer will overtake the cardboard model. In a few years' time, more and more companies will have one and if they don't, it will be like walking into an office and there being no photocopier."

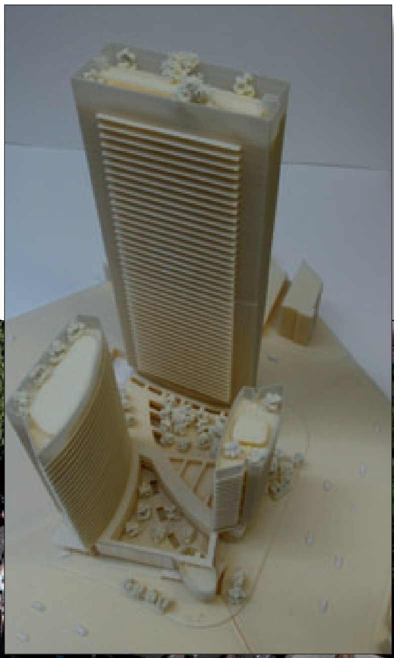
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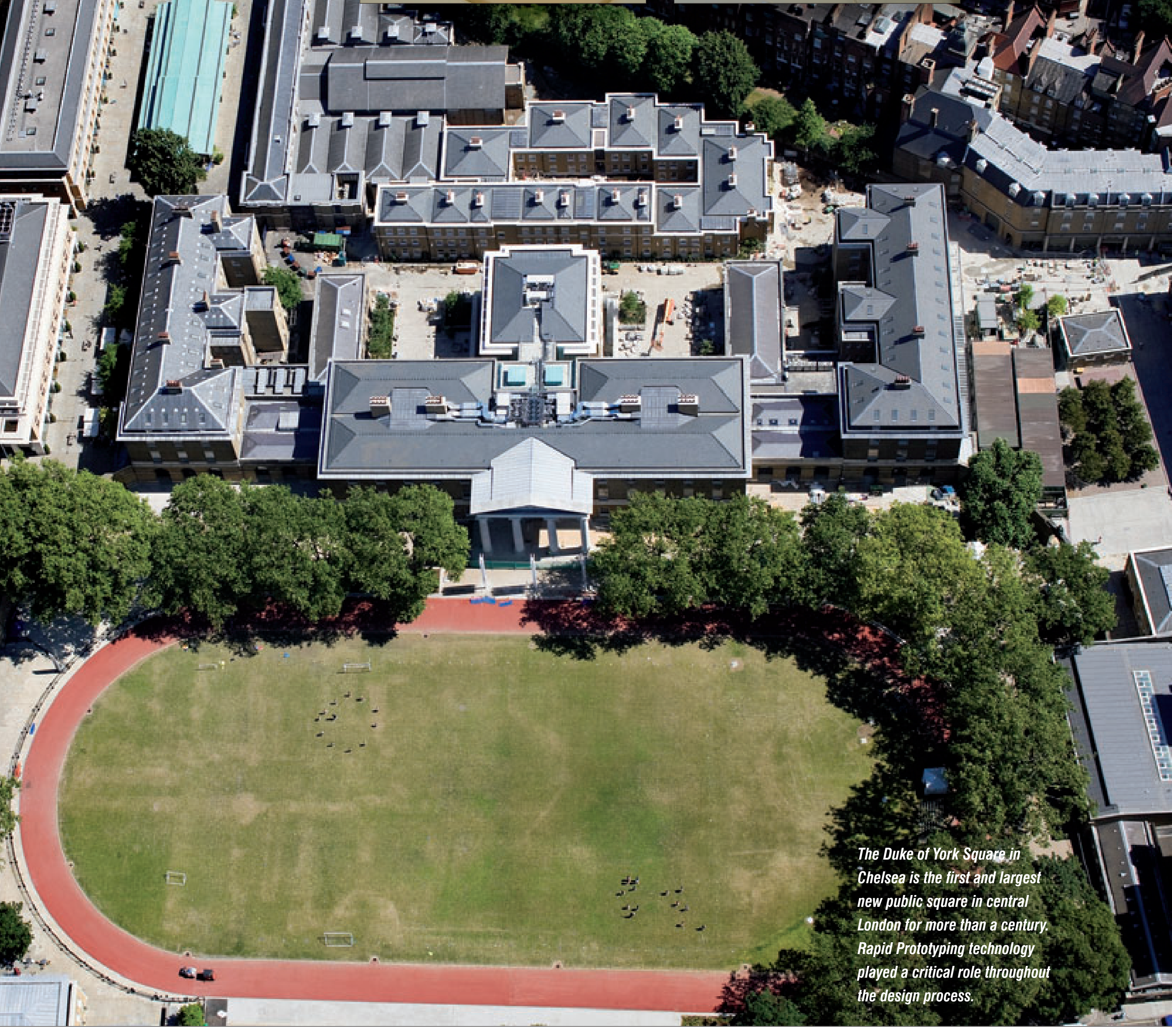
**"I'm constantly amazed at how good the printer is and the detail it can achieve. We weren't quite prepared for the results it can produce."**

**David Hoggard,** ***partner and architect at Paul Davis + Partners***





**Right:** *This two-towered project is a current residential proposal that Paul Davis + Partners is working on in the Far East.*
**Far right:** *A model made for a competition that Paul Davis + Partners entered in mainland China.*



*The Duke of York Square in Chelsea is the first and largest new public square in central London for more than a century. Rapid Prototyping technology played a critical role throughout the design process.*

# Managing people management

Michael Baker Corporation has made of the most its people power through its Bentley ProjectWise team collaboration system.

When Baker chairman Richard Shaw assessed how to maintain and grow profitability for the firm, his analysis landed squarely on one thing: maximising the utilisation rate of the company's employees.

One reason why some Baker employees were underutilised was the lack of standard processes. Another was the difficulties experienced when collaborating among Baker's 44 North American locations. Ultimately, Mr Shaw determined that Baker's ability to maximise employee utilisation significantly depended on the company's ability to more effectively integrate its CADD production offices.

Increasing employee utilisation would certainly have a dynamic impact across the company. In past projects, some CADD and engineering staff were relocated to other offices so they could work more effectively with fellow project team members. This relocation, however, was expensive and adversely impacted staff morale, leading to increased staff turnover. Because access to project work was location-dependent, it was difficult to balance any workload across quiet and busy teams without forcing staff to travel.

## The strategy

With these challenges in mind, Baker formed the CADD Steering Committee and Digital Services CADD Support Team in July 2005. Its primary goal was to reduce overhead costs by minimising staff relocation and reducing travel expenses. To further limit spending, the team sought to implement as many standards as possible, as quickly as possible.

Coincidentally, and around the same time, Baker learned that some state Departments of Transportation (DOTs) in New York, Michigan, Indiana and Kentucky had started asking their consultants and contractors to get connected by ProjectWise – an engineering project team collaboration system.

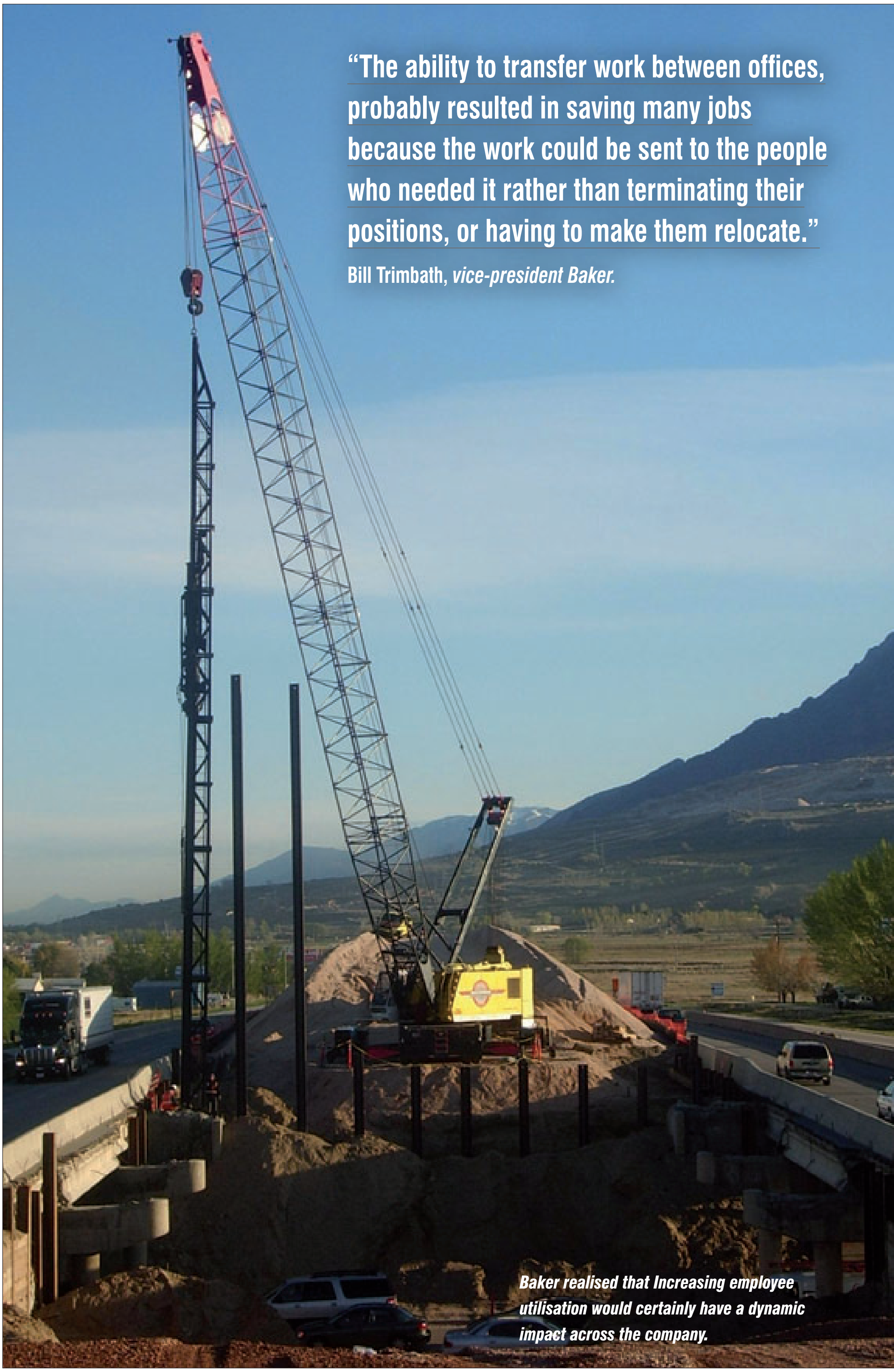
While Baker believed these organisations were among the first to ask consultants to collaborate in this way, Baker also felt sure that many more state DOTs would follow suit. Consequently, Baker felt that by implementing ProjectWise on its own projects, it could better manoeuvre itself to win additional contracts from these organisations.

## The solution

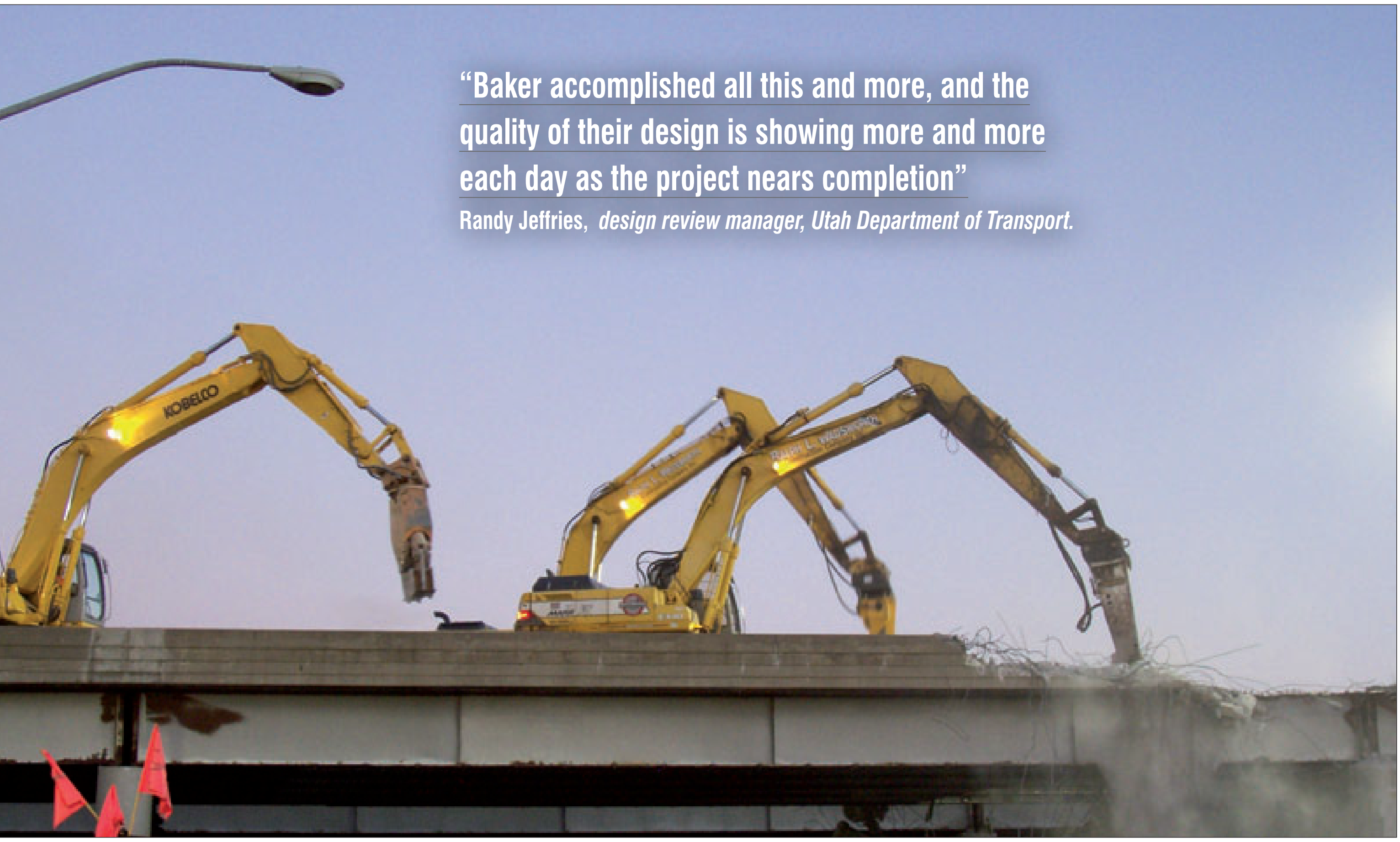
Given the challenges faced and its strategy for innovation, Baker laid out its plan to connect all people and information across its 44 North American offices using ProjectWise. The ultimate goal: Create an

**"The ability to transfer work between offices, probably resulted in saving many jobs because the work could be sent to the people who needed it rather than terminating their positions, or having to make them relocate."**

**Bill Trimbath, *vice-president Baker.***



***Baker realised that Increasing employee utilisation would certainly have a dynamic impact across the company.***




**"Baker accomplished all this and more, and the quality of their design is showing more and more each day as the project nears completion"**
**Randy Jeffries,** ***design review manager, Utah Department of Transport.***

environment to enable real-time collaboration among colleagues – regardless of geographic location.

First, to ensure the team had the right tools and technologies readily available, Baker joined Bentley's Enterprise License Subscription programme, an innovative software subscription that provides significant competitive advantage while reducing annual software costs. Unlike other software subscription programmes, ELS provides infrastructure professionals with unrestricted access to a comprehensive software portfolio for a single annual fee.

Next, to help achieve its collaboration and utilisation goals, Baker decided to deploy ProjectWise – an engineering project team collaboration system used by multi-office organisations to efficiently and securely share work across offices. Through its new ELS, Baker could easily procure and deploy ProjectWise without any up-front capital investment in ProjectWise software.

## The Projectwise deployment

Baker engaged Bentley's Professional Services team to deploy ProjectWise. The Bentley team reviewed other best practice deployments around the globe – to determine the right balance of servers and services – to deliver a world-class solution. Products deployed include ProjectWise Integration Server, Caching Servers, InterPlot and Passport.

## Measuring ROI

An early test of Baker's ProjectWise deployment was on the high-profile I-15 NOW project in Ogden, Utah. Baker was lead designer for the $183 million design/build highway reconstruction project awarded by the Utah Department of Transportation. Baker provided design services on the project, valued at $16 million.

***By connecting project team members across offices using ProjectWise, Baker maximised its employee utilisation for the I-15 NOW project and its investment paid off.***

The ProjectWise learning curve was short for the Baker team. Within just three weeks, everyone was trained and the project was proceeding to plan, with a fully utilised team sharing work in real-time.

By connecting project team members across offices using ProjectWise, Baker maximised its employee utilisation for the I-15 NOW project and its investment paid off.

Implementing ProjectWise achieved significant bottom-line results for Baker. In addition to saving jobs, improving moral, and delivering better projects, an independent analysis of ProjectWise ROI conducted by SMART LLP revealed a peak ROI for ProjectWise at five times the operating cost. Better still, the payback period for ProjectWise was just six short months, or two times faster than the industry benchmark of 12 months.

## Key benefit areas

Baker VP Bill Trimbath lauded the virtues of ProjectWise, highlighting particularly Baker's achievement in maximising employee utilisation. "The ability to transfer work between offices, probably resulted in saving many jobs because the work could be sent to the people who needed it rather than terminating their positions, or having to make them relocate," Trimbath said.

Baker's success on the I-15 NOW Project merited the firm some high praise from one of its key clients, as rigid quality control and improved quality assurance procedures impressed the state DOT in Utah.

"Baker accomplished all this and more, and the quality of their design is showing more and more each day as the project nears completion," said Randy Jeffries, design review manager from Utah DOT, in naming Baker its Consultant of the Year. "All things considered, the Michael Baker Jr., Inc., team has succeeded in helping the minds here at the department stretch to places they've never been before."

Joe Croser, global marketing director of platform products and subscriptions for Bentley said: "With results like these, it's no wonder that ProjectWise is the engineering project team collaboration system selected by multi-office organisations to efficiently and securely share work. ProjectWise is time-proven to help firms large and small successfully deliver infrastructure projects."

***www.bentley.com/projectwise***

## Bottomline

An independent analysis of Michael Baker Corporation's return on investment for getting Connected by ProjectWise (SM) revealed that, on just one project, the firm achieved a peak ProjectWise ROI of five times. The payback period was six months, or two times faster than the 12-month industry benchmark that is typical for enterprise software deployments. By implementing ProjectWise, Baker created an enterprise-level project team collaboration environment to connect people and information across offices. As each Baker team member was connected their utilisation rate increased, while individual relocations and employee travel costs reduced.


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